RAILROAD GAZETTE

FRIDAY, JULY 29.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Elections.—Atlanta & West Point, C. H. Phinizy, President.—Chattanooga Southern, William Crutchfield, President.—Chicago, Kansas & Arkansas, Joseph Broaddus, Chief Engineer.—Chicago & Northwestern, John M. Whitman, General Manager.—Columbus Southern, T. J. Pearce, President.—Lake Superior & Southwestern, Andrew Knox, President.—Monongahela & East Shore, Charles Donnelly, President.—Panama, J. E. Reeves, General Superintendent.—Pittsburgh, Youngstown & Ashtabula, John N. Hutchinson, President.—Polk County Real Estate & Railroad, D. Hughes, President.—Saginaw & Durand, A. W. Wright, President.—Syracuse, Ontario & New York, George H. Graves, Superintendent.

Personal.—L. P. Grant resigns Presidency of Atlanta & West Point.

New Companies Organized.—Jacksonville & Fort George Island is organized in Florida.—Lake Superior & Southwestern is organized in Minnesota.—Metropolitan files articles in Illinois.—Monongahela East Shore obtains charter in Pennsylvania.—Pittsburgh, Youngstown & Ashtabula is organized in Pennsylvania.—Polk County Real Estate & Railroad is organized in Florida.—Railway & Navigation is incorporated in Minnesota.—Saginaw & Durand is organized in Michigan.—Silverton is incorporated in Colorado.—Sonoma Valley Extension is incorporated in California.—Staten Island Belt Line is incorporated in New York.

Changes and Extensions.—*Alabama:* East & West Alabama begins tracklaying on extension.—*Arkansas:* St. Louis & San Francisco is extending Little Rock branch east to Chocoville.—*Georgia:* Atlanta & Hawkinsville begins tracklaying at Atlanta.—*California:* Vaca Valley & Clear Lake begins work on extension.—*Illinois:* Chicago & Eastern Illinois will build branch from Momence to Goodell.—*Maine:* York Harbor & Beach will open Aug. 8.—*Missouri:* Central Missouri begins tracklaying at St. Charles.—*Montana:* Utah Northern is changed to standard gauge.—*New York:* Buffalo & Geneva will begin survey.—*Nebraska:* Burlington & Missouri extends branch 30 miles west of Grant.—*Tennessee:* Chattanooga, Rome & Carrollton will begin work at once. Carolina & Knoxville will be completed. Cincinnati Southern will build 2-mile branch.

Leases and Sales.—Duluth & Manitoba leases part of its line to Northern Pacific. New York, Pennsylvania & Ohio leases the New Castle & Shenango.

Traffic.—Anthracite coal shipments for the week ending July 23 show increase of 9.5 per cent., as compared with corresponding week last year; bituminous shows decrease of 8.2 per cent.; coke, for week ending July 16, shows decrease of 50.2 per cent. Cotton receipts, interior markets, for week ending July 22, shows decrease of 84.0 per cent., as compared with corresponding week last year; shipments show decrease of 52.0 per cent.; seaport receipts show decrease of 51.1 per cent.; exports, decrease of 52.0 per cent.; cotton in sight is less than at same date last year by 24.6 per cent.

Contributions.

Trainmen's Eyesight.

LEICESTER, Eng., June 20, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of May 27, page 352, attention was directed to the important subject of engine-drivers' eyesight, which is engaging so much attention in this country. The usual scientific tests with dots and wool have been very generally used, but it is now found in practice that they are inefficient, do not insure a driver having proper sight, and are in many instances unfair to the drivers. Some men can see the dots on the card and give the names of various shades of wool, and yet are unsafe to be upon a locomotive, as they cannot see signals and objects at the required distances; whereas, on the other hand, there are drivers who can see signals and lights at a distance of a mile, 1,000, 700 and 500 yards who do not know the names of the shades of wool, and who cannot see the "dots" at 15 feet, and are, therefore, taken off the engines.

At the last meeting of the executive committee of the Amalgamated Society of Railway Servants of England, held in London on May 27, it was *Resolved*, "That this committee, having considered the question of eyesight testing, considers the only practical test to be with signals and lamps, both by day and night, but still considers the card, for a theoretical test, not too severe if fairly applied."

The strong objection to the theoretical test is not "*prejudice*," but the result of practical experience.

On behalf of the committee,

CLEMENT E. STUTTON, C. E.,
Vice-President and Consulting Engineer Amalgamated Society of Railway Servants.

[Some comment on Mr. Sutton's letter will be found in the editorial columns.—EDITOR RAILROAD GAZETTE.]

The question of the tests that are and should be employed to test the vision of railway servants has been the subject of discussion at a recent meeting of the engine drivers and firemen of the Gateshead section of the Northeastern Railway It was acknowledged by the chairman, an engine driver, that it was essential that railway men should have good sight, but he thought (and several of the speakers agreed with him) that the tests they were put through at present were too severe and altogether foreign to a railway man's duties. The principal objection seemed to be raised against the use of dots, and it appears that at a recent examination, out of 1,000 men 12 or more were stopped, and, although they had not been turned adrift, they had been placed on wages which had been reduced to the extent of from 5 to 25 shillings per week. One of the speakers, whose wages had been thus reduced, had only one eye perfect, the other being defective. The whole case lies in a nutshell. The lives of the passengers must not, on any consideration, be exposed to unnecessary risk, and undoubtedly to place a train under the care of a one-eyed man is an unnecessary risk. Suppose a spark, or even a fragment of coal dust, lodged in the eye; pain, spasm and free lacrymation would at once deprive him of all useful vision. The company are therefore perfectly right in replacing a one-eyed man, or a man with defective vision, by one who has two good eyes, especially on an express train, where quickness as well as keenness of sight are required. But the men have, we think, just grounds of complaint that they should have been placed in positions of trust, and advanced from one post to another, and then, when they have done all the drudgery and have secured a good salary, they should be abruptly told that they are unfit for their work. It is the duty of the company and of its officers to see that no man with defective vision is entered upon its staff, but, once admitted, if his sight is found to fail, he should be pensioned, or supplied with work in which the failure of vision is of relatively small importance. He should not be allowed to be a loser for a piece of carelessness on the part of the employers.—*London Lancet.*

The Rote Brake.

NEW YORK, July 23, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE.

The Rote Brake Co. ask me to write your paper for publication what I think of the Rote brake. I hauled their heavy train from Chicago to New York. It worked perfectly from beginning to finish. It never missed, it went up and down grade and over sags perfectly. I always held perfect control over my train. I have used air brakes for years, and until I used the Rote considered them the best, bu I am convinced that for practical railroading the Rote brake is very much ahead. It will not stop a train quite so quickly, but it does it perfectly and smoothly, and it never gives engineer or trainmen any trouble. It is simple—always works—never fails, and if anything human is perfect this brake is that thing. I write this because the Rote Brake Co. say they prefer I should write the results of the trip than to do it themselves, as they are interested and I am in no way whatever, except in hoping to see this brake come into general use, for it will be a good thing for every engineer in the country and for every other trainman. I will be glad to give further information to any engineer who writes me to my home in Galion, O.

I have run freight and passenger engines for 8 years, and for my character and capacity as an engineer I refer to Mr. C. J. Clifford, M. M. 3d and 4th Divisions, N. Y., P. & O. R. R.

JOHN B. LOVETT.

[The run of which Mr. Lovett writes was that just made by the Rote 50-car train from Chicago to Jersey City over the Chicago & Atlantic, New York, Pennsylvania & Ohio and Erie.—EDITOR RAILROAD GAZETTE.]

Poor Cast-iron Wheels.

JULY 25, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I do not think you can do better work in your paper than to work up a strong sentiment on the subject of cast iron wheels.

If they are properly made there is very little danger from cast-iron wheels, but the kind of wheels which we find under cars passing over our road are a disgrace to to the firms who manufacture them, and the sooner that this is made known the better.

S. M. P.

The Metric System.

CHICAGO, Ill., July 25, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The extracts published in your number of July 22, from the *Journal of the Association of Engineering Societies*, upon the metric system, give additional assurance that al engineers and students of science must become educated in the use of that system, and should familiarize themselve, with its dimensions; for the person who has had no experience in the use of it must stop to think a little while, or to figure with his pencil, in order to understand and apprehend as he reads the metric measures, employed by almost all foreign societies, and now become the daily language of electrical engineers and chemists, even in this country.

We can have no conception of the British Association units employed for electrical measurements throughout the world, nor of the weights employed in modern chemistry, without a very clear appreciation of the values indicated by the terms of the metric system. Feeling the necessity for some acquaintance with these dimensions, I purchased for myself, some time ago, a little boxwood rule, which has proved of service to me, and which, perhaps, would be a convenience for other railroad men who wish to familiarize themselves with the metric system. This rule is 1 decimetre long—that is to say, 10 centimetres, and it contains three scales, viz., centimetre, half-centimetre, and one-fifth-centimetre, or according to the decimal denomination, .01, .005, and .002 centimetre.

Now as the metre is 39.37 in. long, 10 centimetres are equal to 3.937 in., or within .063 of an inch of 4 in. long; and three times this is within .19 of an inch of being a foot long. Two and one-half centimetres is (within a very small fraction) equal to one inch.

The *litre* is the unit of capacity in the metric system. It is a cube of exactly one decimetre, which I have at once before my eyes on looking at my little rule, and as I remember that one litre equals 1.06 quarts, wine measure, I am able to reproduce more accurately the proper dimensions of a bottle than by consulting any of those in which our temperance drinks are sold. This cubic decimetre of pure water weighs one kilogramme, and the cube of the centimetre of pure water is the *gramme*, the basis of all weights in the metric system. It is easy to remember that 15.44 grains troy are equal to one gramme, and that ten kilogrammes are a gross ton (nearly). So I find this little rule to give me not only the metric system at a glance, but more convenient approximations for our old measurements than any we have in our system, because they are decimal and because they are all as to length, area, weight or capacity based upon a division of the metre. My rule is stamped Keuffel & Esser, New York. If this note shall prompt one, etc., etc., I shall be rewarded, etc., etc.

ARCHIMEDES STEVENSON WATT.

Tunneling on the Croton Aqueduct.

The new Croton aqueduct, is intended to convey 320,000,000 gallons of water to this city daily. It has been so located as to be in tunnel as much as possible, and between the Croton dam and Harlem River, only about one mile is to be built from open cuts.

The progress of the work. The work remaining to be done is shown below.

Tunnel excavation completed:
143,974 lineal feet = 1,113,058 cu. yds.
To be excavated:
12,788 lineal feet = 98,864 cu. yds.
Brick lining complete:
52,309 lineal feet = 117,693 cu. yds.
To be laid:
99,361 lineal feet = 22,356 cu. yds.

Miles of tunnel excavated	27.3723 miles.
Miles open cut excavated	1.0565 "
Total	28.4288 "
Miles of unexcavated tunnels	2.4220 "
Total aqueduct	30.850 "

The aqueduct, as shown in Figs. 1 and 2, is either circular or horseshoe in section. There are two sizes of this circular section, 10½ by 12¼ ft. in diameter, and the tunnel linings vary by 4 in. increments from 12 to 24 in. in thickness, depending on the ground. The excavation required varies from 4.6 to 6.1 cubic yards per foot run for the small circular section, from 6.0 to 7.7 cubic yards for the larger section, and from 7.6 to 9.5 cubic yards for the horseshoe section. These are the quantities paid for, though when timbering is required the excavation may be increased to 13 or more cubic yards per foot run.

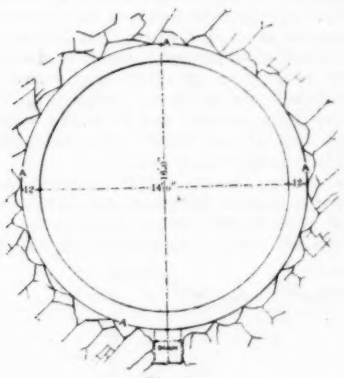


Fig. 1.

In lining the tunnel the void spaces outside of the rings are filled with rubble masonry, which is paid for.

The tunnel is lined with hard-burned brick masonry laid in mortar made of one part of American cement to two parts of sand.

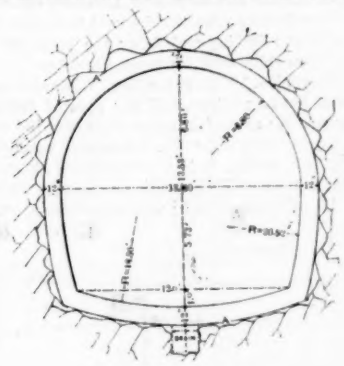


Fig. 2.

Since its inception the engineers and contractors on the work have tried to improve in methods and speed over all previous work of the kind and have succeeded.

The various records have been as follows:

June, 1886. Shaft No. 23, north heading.

254½ ft. of full tunnel 14 ft. by 14 ft. in 22 days, with 4 Ingersoll Eclipse drills in heading and one on bench Force, two men per drill.

Progress per day, 11.52 ft.

June, 1886. Shaft No. 23, south heading.

265½ ft. of full tunnel 14 × 14 in 26 days. Drills and force as above.

Progress per day, 10.21 ft.

All of the above rock was blasted with dynamite. The

Eclipse drill has a 3¼ in. cylinder and 6½ in. stroke, and the were, in this instance, worked at 60 pounds pressure in the compressor house, requiring about 75 cubic feet of free air per drill per minute.

Jan. 3 to Feb. 1. Shaft No. 15, south heading.

288 ft. of heading 8 ft. × 16 ft. in 24½ days, with two Rand Slugger drills. Force, 2 men per drill and 8 muckers.

Progress per day, 11.75 ft.

Jan. 3 to Feb. 1, 1887. Shaft 15, south heading.

326 ft. of heading 8 ft. × 16 ft. in 25 days, with three Rand Slugger drills. Force as above.

Progress per day, 13.04 ft.

Jan. 15 to Feb. 1. Shaft No. 20, north heading.

189 ft. of heading 8 ft. × 21 ft. and timbered in 14 days, no Sunday work, with three Rand slugger drills. Force, 2 men to drill and 8 muckers.

Progress per day, 13.5 ft.

Feb. 19 to 26, 1887. Shaft No. 15.

102.1 ft. of heading 9 ft. × 17 ft. in 6¼ days, with three Rand slugger drills. Force, 6 drillers and 8 muckers.

Progress per day, 15.7 ft.

All of the rock drilled with the Rand drills was blasted with Rackarock, which is a solid composed mostly of chlorate of potash impregnated with oil of mybane, which is a nitro-benzole of the coal tar products.

The Slugger drills have a $3\frac{3}{16}$ in. cylinder and 6½ in. stroke. The air was furnished by an 18 in. × 30 in. duplex

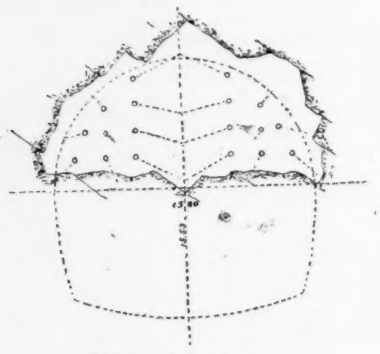


Fig. 3.—Cross Section.

Rand compressor, class B, which should have furnished 1,325 cubic feet of free air per minute at 75 revolutions, and was run at 80 pounds pressure at the compressor.

The progress above cited was a great improvement over anything done before, particularly as it is claimed to have been done in all cases by the foreman, without the aid of extra hands or extra pay, in the ordinary ten hour shift. The best preceding progress was 84 ft. in a week on one of the South Pennsylvania tunnels. The fastest work in the Sutro tunnel was 10.3 ft. per day.

Messrs. Denton, Breuchard & Co., nothwithstanding this record, started in on the morning of July 16 to break it. The record as given by Mr. Gaylord Thomson, the engineer in charge, is below. Figs, 3. 4 and 5 show the dip and strike of the

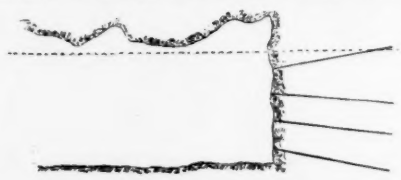


Fig. 4.—Longitudinal Section.

rock correctly, and the disposition of the holes, which in general has been the same in all the instances cited. The procedure has been to fire the cut holes first, breaking out a wedge in the face, then the two rows of holes next to the cut and lastly the corner holes; drilling and firing the holes having been the work of one shift, until the present instance.

Section 8. Shaft No. 16, north heading. Week ending July 23.

Length of heading driven, 127 ft.; area of heading paid for, 96 square ft.; area of heading taken out, 104 square ft.; number of drills used, two "No. 3 Rattlar;" diameter of cylinder, 3⅝ in.; stroke, 8 in.; air pressure at compressor, 80 pounds; cubic feet of free air per minute, 530; number of shifts, 14, of 12 hours each; number of blasts, 18, with 18

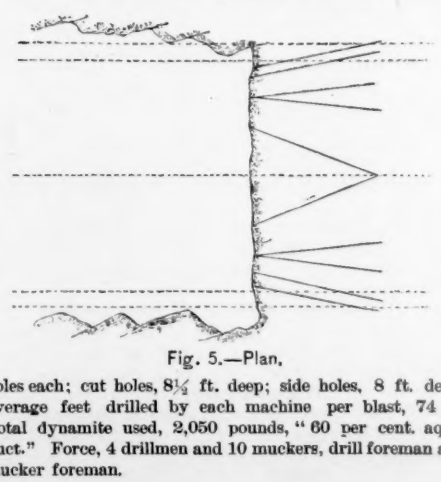


Fig. 5.—Plan.

holes each; cut holes, 8½ ft. deep; side holes, 8 ft. deep; average feet drilled by each machine per blast, 74 ft. Total dynamite used, 2,050 pounds, "60 per cent. aqueduct." Force, 4 drillmen and 10 muckers, drill foreman and mucker foreman.

Messrs. Denton, Breuchard & Co. think there is no opportunity left on the aqueduct to beat this, and their very full log of the week's proceeding is printed, as of interest to all engineers.

RECORD OF RUN MADE DURING WEEK ENDING JULY 23, 1887.

North Heading, Shaft 16.

Date—July.....	No. of shot.....	Commenced to muck out and set up.....	Commenced to drill.....	Finished drilling...	Commenced to blast...	Finished blasting...
16	1	10.00 a. m.	11.30 a. m.	4.30 p. m.	5.00 p. m.	6.30 p. m.
16	2	7.00 p. m.	9.30 p. m.	3.00 a. m.	3.30 a. m.	6 00 a. m.
17	3	7.00 a. m.	9.00 a. m.	2 00 p. m.	2 30 p. m.	3.30 p. m.
17	4	3.45 p. m.	7.00 p. m.	11.45 p. m.	12.00 p. m.	1.00 a. m
18	5	1.15 a. m.	3.15 a. m.	8.45 a. m.	9 00 a. m.	10.00 a. m.
18	6	10.15 a. m	12.30 p. m	5.30 p. m.	6.00 p. m.	7.00 p. m.
18	7	7.15 p. m.	9.30 p. m.	2.30 a. m.	3.00 a. m.	4.00 a. m.
19	8	7.00 a. m.	9 30 a. m.	3.00 p. m.	4.00 p. m.	4.45 p. m.
19	9	5.00 p. m.	7.30 p. m.	1.30 a. m.	2 00 a. m.	3.00 a. m
20	10	3.15 a. m.	5.30 a. m.	10.15 a. m.	10.45 a. m.	11.45 a. m.
20	11	12.00 m.	1.30 p. m.	6.00 p. m.	6.15 p. m.	7.00 p. m.
20	12	7.15 p. m.	9.15 p. m.	2 00 a. m.	2.15 a. m.	3.30 a. m.
21	13	3.45 a. m.	5.00 a. m.	9.30 a. m.	9.45 a. m	10.15 a. m.
21	14	10.30 a. m.	12.00 m.	5.30 p. m.	6.00 p. m.	7.00 p. m.
21	15	7.30 p. m.	10.00 p. m.	3 30 a. m.	4.00 p. m.	4.45 a. m.
22	16	7.00 a. m.	9.30 a. m.	2.30 p. m.	3 00 p. m.	4.00 p. m.
22	17	4.30 p. m.	7.00 p. m.	1.30 a. m.	2 00 a. m.	2.45 a. m.
23	18	3.00 a. m	4.30 a. m.	9.00 a. m.	9.15 a m.	9.45 a. m.

Progress, 127 ft.

2,050 lbs. 60 per cent. aqueduct dynamite was used altogether for the 18 shots.

Total number cars muck hoisted, 953.

DENTON, BREUCHAUD & CO.

They note that one hour and twenty minutes were lost by "air tank taking fire," and the muckers, Hungarians and Polish Jews, struck twice. The heading was fairly mucked out, however, at the end of the run.

The heading ended 3,965 feet from the shaft, and the blast, which was supplied by one of Rand's 18 in. × 30 in. Class B duplex compressors through 1,900 ft. of 4-in. pipe, 1,415 ft. of 3-in. pipe and 650 ft. of 2-in. pipe, lost 20 pounds of pressure through friction, when both drills were running.

The total hours charged above to drilling were 87¾; this for each drill gives fully 15 ft. drilled per hour. The 18 blasts averaged a gain of 7 ft. each, making the advance equal to 88 per cent. of the depths of the side holes. The rock was a uniform and fine-grained gneiss, which might be called a mica schist, without many noticeable quartz veins, and free from open seams, so that there was no trouble with the roof.

Putting this in the same form as the others, we have

July 16 to 23, 1887. Shaft No. 16, north heading.

127 feet of heading 9 × 16, with two Denton's Rutter drills.

Force, 4 drillers, 10 muckers.

Progress per day, 18.14 ft.

It will be noticed, as a matter of comparison, that the week in which 102.1 ft. were made had only 13 shifts of 10 hours each, against 14 shifts of 12 hours each, and though as much per hour cannot be done in a 12 hour as in a 10-hour shift, more can be done per shift. Only 13 shots were blasted in the case of the 102.1 ft. progress, and the average advance was 7.82 ft. each; the side holes are said to have been 9 ft. deep and the cut holes 9½. This would make a gain of 87 per cent. of the depth of hole, against 88 per cent. at shaft No. 16. Unless there was a decided difference in the rock, this shows a remarkable coincidence in the effectiveness of the combined skill in pointing the holes and power of explosives.

If the times occupied in drilling were proportioned to the lengths of shifts, the feet drilled per hour were as 5⅛ to 6.

At the south heading of shaft 17, Messrs. Denton, Breuchard & Co. ran out of rock into a coarse sand and gravel, which they are timbering by the bar or English method.

The Blaine Dump Car.

The accompanying illustrations represent a new form of dump car that has been lately introduced by the Blaine Side Dump Car Co., of Dayton, Ohio.

The body of the car is mounted on rollers on curved paths. These curved paths are placed just over the trucks, and are plainly shown in the illustrations. The body is made to travel on these curved paths by means of chains connected to a shaft which is rotated by means of a worm-wheel and screw actuated by a suitable hand wheel placed at the end of the car. The varying tendency of the car to tilt is compensated by spiral springs underneath the car. These springs assist materially in restoring the car to a horizontal position after the load is dumped.

The latches of the side doors open automatically when the car is inclined a certain amount, as chains connecting the latches to the draw sills of the car then become tightened The latches close automatically when the car is restored to a horizontal position.

It will be noticed that the draw timbers are continuous and that they receive all the buffing and draft strains which do not affect the body of the car.

It is claimed that this car can be operated with greater ease and rapidity than any other style of dump car, and that the contents can be partially dumped if required and the car then moved and the remainder of the load dumped.

Two hundred of these cars have been built lately for the Union Pacific. Our perspective view is prepared from a photograph of a car for the Utah & Northern.

The weight of a car complete is about 26,000 lbs.

The following is a specification of the car:

SPECIFICATION. BLAINE'S PATENT SIDE DUMP CAR.

Capacity, Twenty Tons.

GENERAL DESCRIPTION.

Length of car over deadwoods, 33 ft. 3 in.
Length of car over draw-bars, 34 ft. 10 in.
Length of car over end sills, top body, 31 ft.
Width of car over side sills, 8 ft 6 in.
Entire height of car from rail, 7 ft. 6 in.
Rail to centre of draw-bar, 2 ft. 10 in.
Rail to top of brake staff, 6 ft. 8 in.
Rail to top of dump staff, 6 ft. 8 in.
Bottom of car to top of door, 2 ft. 6 in.
Length of car inside, 28 ft. 10 in.
Inside width of car, 8 ft.
Brake end 20⅛ in. longer and tail end 7 in. longer than top frame of car.

BILL OF TIMBERS.

Norway Pine.

4, 32 ft. 8 in. long, 4 × 8, bottom stringers.
2, 30 ft. 4 in. long, 4½ × 12, top sills.
4, 30 ft. 4 in. long, 4½ × 7, stringers.
12, 14 ft. 1 in., 3 × 10 side planks.
6, 8 ft. 6 in., 3 × 10 end planks.
Yellow pine flooring, 8 ft. 9 in. long, to be dressed to 1⅛ in., not to be over 8 in. wide, ship lapped.

White Oak.

4, 9 ft. 6 in. long, 4½ × 8, filling between bottom stringers.
2, 4 ft. 10½ in., 5 × 14, lower transoms.
2, 9 ft. 2 in., 6 × 8, end sills.
2, 3 ft. 6 in., 6 × 11½, bottom end sills.
2, 7 ft. 11 in., 6 × 6, top middle timbers.
1, 2 ft. 10¾ in., 5 × 5, bottom centre cross timbers.
4, 4 ft., 5 × 9, corner posts.
2, 4 ft. 2½ in., 5 × 9, middle posts.
4, 1 ft. 10¼ in., 3½ × 5½, truss rod blocks.
2, 1 ft. long, 2 × 5, back of middle posts.
4, 8 ft. 6 in. long, 2 × 5, corner.
4, 2 ft. 2 in., 1¾ × 3¼, side corner and end to hold side planks.
2, 1 ft. 5 in., 2½ × 8½, middle post.
2, 7 ft. 1 in. long, 7 × 12½, top truck timbers.
2, 7 ft. 1 in. long, 4 × 14, bottom truck timbers.
2, 5 ft. 8 in. long, 4 × 6½, brake beams.
2, 1 ft. 2¼ in. long, 4 × 4, truss blocks.
2, 2 ft. 8 in. long, 4½ × 5.
2, 2 ft. 7½ in., 4 × 5.

Timbers Finished to Dimensions

		In.
Length of stringers, lower body	32 ft.	6¾
Length of tenons		1½
From shoulder on tenon centre of transom and rear end of car	4 ft.	10½
Front end of car, do	5 ft.	9
Inside of tenons to centre of Butler draw bar		19¼
Top body length over tenons	30 ft.	3
Tenons		1½
Between end sill and centre of transom, front end	4 ft.	½
Back end, from end sill to centre of transom	4 ft.	5
Needle beam from centre post of car	2 ft.	5
End sills finished	6 × 8 × 9 ft.	
From centre of end sill to centre of mortise		9¼
From centre of mortise to centre of intermediate mortise		123¾
From centre of intermediate to outside sill		26¾
Dead wood end sill over all to finish	3 ft. 6 in., 6 ×	11¼
Square hole in centre of dead wood		6⅝
From centre of dead wood hole to center of mortise		6⅝
From centre of mortise to centre of mortise		8½
Height of posts from top of side sill	3 ft.	2

Miscellaneous.

	Lbs
8 brasses	80
8 cylinder springs	273
1 in. steel 6 in. dia. each, 15 in. long. Four of these springs compress 22 in.	
1 (cold roll) or steel shaft, 2½ × 23 ft. 3⅛ in	390
1 " " " 2¾ × 5 ft. 6 in	73
4 " " " 2⅛ × 14⅛ in	106
Total	569
4 truck springs, 6¼ in. long between timbers (A. French & Co.)	178
2 draw-bar springs, 5½ × 6 in., 2 coil (Butler draw-bar)	37½

Chain.

8 pieces 5-16	24
4 pieces 9-16 × 6 ft. long, cylinder	76
Best of charcoal iron or steel	100

Malleable Iron.

	Lbs.
4 crescents	445
2 segments	260
1 large cog wheel	52
2 cog pinions	42
1 web pinion	17
1 worm	11
8 chain hangers	8
8 chain grips	4
8 side dog holders	33
8 segment grips	35
16 roller brackets	8
1 drop block and hook	7
Total	922

Forgings.

TRUCKS.

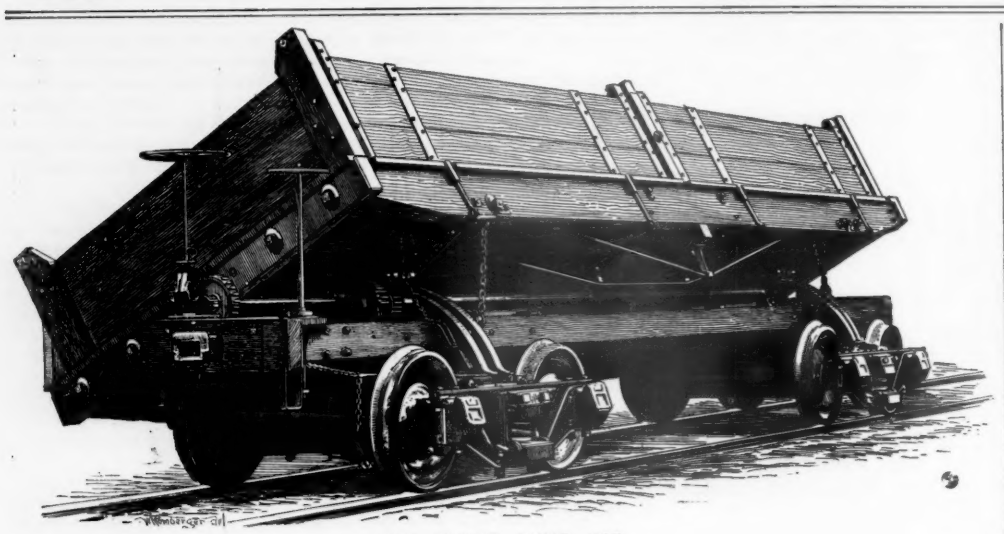
	Lbs.
4 arch bars, 1¼ × 3 × 6 ft., 6½ in	328
4 arch bars, 1¼ × 3 × 7 ft., 7 in	390
4 tie bars, ¾ × 3 × 6 ft. 8 in	205
4 truck truss rods, 1⅛ × 7 ft. 6½ in	105
4 truck truss plates, 1 × 3 × 14 in	48
4 brake hanger straps	139
4 brake hanger 1-in. rods	38
8 safety chains and hooks, ⅛ × 2	32
4 pieces ⅛ × 2 × 3 ft. 8 in. brake connections	56
8 safety chain hanger hooks, ⅝ rd	9
	1,350

BODY.

	LBS.
2 transoms, 1¼ × 10 × 9 ft. 4½ in	790
2 body tie rods, ⅞ rd. × 8 ft. 10 in	39
2 body truss rods, 1⅛ rd. × 31 ft. 10½ in	230
2 body truss rods, 1⅛ rd. × 31 ft. 7½ in	225
2 king pins, 1¾ × 19	29
2 tail pins, 2 × 24	48
8 door straps 5-16 × 4 × 5 ft. 2½ in	175
8 hinge straps, 5-16 × 4 × 5 ft. 10 in	204
4 door hinge pins, 1⅛ × 17	34
2 door hinge pins, 1⅛ × 21	23
1 worm gear staff, 1½ × 37 in	22
1 brake mast, 1¼ × 28	12
1 piece, 1½ × 22	12
2 brake levers, ¾ × 3 × 27	36
8 lever shanks, ⅝ × 2 × 19	16
1 staff plate, 3-16 × 4 × 6	2
8 safety chain hangers, with link	35
2 coupling pins, 1½ × 12	12
1 coupling link	13
4 draw-bar followers for Butler Patent attachment, 5⅛ rd. × 2½ hole ½ thick	14
2 deadwood plates ⅜ × 11 × 28½	83
8 dogs for doors, 1 × 1 × 18	45
4 pieces ⅛ × 3½ × 5 ft. 2½ cross transom	120
2 cyl. tail bolts truss	16
4 truss rods, 1 rd. 2 ft. 4 in	29
2 tail pin keys, ⅜ × 2½ × 8 in	3
Split keys	2
4 ¾ U bolts	7
4 1⅛ with 1¼ ends, jaws ⅛ × 2 transom truss rods	38
4 U bolt plates, ¼ × 3 × 6	5
2 steps, ⅜ × 2	12
1 brake mast bracket, ⅜ × 2½	8
8 strap bolts	28
Miscellaneous (including cotter keys)	250
	2,617

THE BLAINE DUMP CAR.

Made by the BLAINE SIDE DUMP CAR CO., *Dayton, O.*



THE BLAINE DUMP CAR.

Made by the BLAINE SIDE DUMP CAR CO., *Dayton, O.*

Cast Iron.

8 brake heads	149
8 brake shoes	152
2 draw heads	285
4 cylinder sheive wheels	46
2 cylinder washers	16
4 brackets for chain roller	40
8 chilled segment rollers	88
8 oil boxes	592
8 truck columns	200
12 truss rod bearing brackets	40
1 worm gear wheel	65
1 worm gear staff wheel	28
1 brake wheel	21
8 column guides	61
1 ratchet wheel and dog	7
2 centre plates, top and bottom	194
8 oil box wedges	59
2 spring cylinders	352
8 door hanger castings	130
8 roller castings for chains	7
8 anti-friction rollers	15
12 post castings	55
8 lever castings	29
8 crescent spools	250
2 Butler spring pocket castings and attachments	85
1 worm gear hood	47
1 shaft bearing	82
8 side bearings	55
4 brake beam yokes	85
8 lever weights	7
4 truss rod washers	41
8 body rod washers	28
8 truss rod washers	37
4 truss brackets	35
2 long truss brackets	14
4 truck truss brackets	8
4 centre post truss rod washers	65
4 anti-friction spools for cylinder chain	
	3,393

Bolt List.

UPPER BODY.

4 ¾ × 12	4 ⅝ × 13½	8 ½ × 3
4 ¾ × 6¾	4 ⅝ × 9¾	8 ½ × 3¾
4 ¾ × 3½	12 ⅝ × 9¾	16 ½ × 5½
8 ¾ × 3	8 ⅝ × 13½	24 ½ × 7½
8 ¾ × 2¼	8 ⅝ × 8½	24 ½ × 6⅞
4 ¾ × 13	8 ⅝ × 7¾	104 ½ × 4½
2 ⅝ × 17¾	8 ⅝ × 3¾	16 ½ × 2¾
4 ⅝ × 5½	8 ½ × 5¾	

Lag Screws in Upper Body.

2 ⅝ × 7	4 ½ × 3	8 ½ × 2½

Rods.

2¾ × 3 ft. 7 in. 2 ⅞ × 8 ft. 10 in.

LOWER BODY.

4 ⅞ × 14	8 ⅝ × 5¼	4 ⅝ × 9½
1 ¾ × 2½	2 ⅝ × 5	3 ⅝ × 11½
8 ¾ × 2 ft. 10¾ in.	2 ⅝ × 14¾	1 ⅝ × 12¾
16 ¾ × 13½	2 ⅝ × 11⅝	4 ½ × 12
8 ¾ × 6¼	1 ⅝ × 12¼	2 ½ × 7¼
8 ¾ × 6¼	1 ⅝ × 14¾	1 ½ × 2½
8 ¾ × 2¼	1 ⅝ × 5½	4 ½ × 8½
4 ¾ × 3½	12 ⅝ × 13¼	6 ½ × 8¾

Lag Screws in Lower Body.

6 ⅝ × 6	1 ⅝ × 4½	16 ⅜ × 2¾
4 ⅝ × 5	4 ½ × 2½	10 ½ × 3
12 ⅝ × 4	1 ½ × 3	
8 ⅝ × 3	8 ⅝ × 5	

Truck Bolts.

8 1 × 21¼	4 ¾ × 3¾	8 ⅝ × 10
16 1 × 14⅝	4 ¾ × 4¼	8 ⅝ × 4¾
8 ¾ × 17¾	8 ¾ × 8¾	8 ⅝ × 8
8 ¾ × 8¾	8 ⅞ × 5½	8 ½ × 2½
8 ¾ × 6⅛	12 ⅝ × 13¼	

General Stipulations.

All timber and materials for forgings, castings, malleable iron, and all wood and iron work, springs, painting, etc. must be of the best workmanship and materials throughout.

The construction of these cars must be in strict accordance with the dimensions given in specifications.

All gearings, shaftings, crescents, segments, etc., to have two coats of paint.

All shaft bearings, chilled wheels, sheive wheels, worm staff bearings, etc., to be bored out in good workmanlike manner.

The cars will be subject to the inspection in the course of construction, and at their completion, of a competent person.

Wheels and axles are not included in this list, but will conform to the M. C. B. standard.

Care should be taken in adjusting chains that operate side door dogs so as to have them all open at the same time. This is done by taking up or dropping a link in grips or stringers.

Bridge Inspection on the Erie.

Under the system of inspection and reports now in force on the Erie there are employed 10 inspectors who report directly to their respective Division Roadmasters each month, and every three months the Division Roadmasters make inspections and report to the Division Superintendents. These quarterly reports are forwarded through the General Roadmaster and General Superintendent to the Engineer of Bridges and Buildings, in whose office they are filed. The inspectors have no other duties than those of inspection.

The blank forms for the inspectors' reports are on sheets 20 inches square. The heading of the sheet is as follows:

Form X. 402.

N. Y., L. E. & W. R. R. CO.

REPORT SHOWING CONDITION OF BRIDGES ON THE..... DIVISION, MONTH ENDING .....18..

The sheet is ruled in 17 vertical columns, of which the headings are as follows: Number; Kind of Bridge, Wooden or Iron; *General Conditions of* Masonry, Bed Plates, Rollers and Frames, Pedestals, Main Trusses or Girders, Lateral System, Iron Floor System, Rivets, Hangers, Castings, Paint; Action under Trains; Date of Inspection; Remarks and Recommendations. This is to be signed by the Inspector, and at the foot is further space for remarks. On the back of sheet are printed the following orders and directions:

NEW YORK, LAKE ERIE & WESTERN R. R. CO.

GENERAL ORDERS FOR THE INSPECTION OF BRIDGES.

1. Besides the constant and careful examination of all bridges by the regular Inspector, each Roadmaster shall make a personal and thorough inspection of the same once every three months.

2. A regular report of the condition of every bridge shall be made by the Inspector to the Division Roadmaster every month, upon blanks furnished for that purpose,

3. The quarterly examination made by the Roadmaster shall be reported upon form No. X, 402 A, but must be signed by him and forwarded to the Division Superintendent, who shall in turn transmit it through the proper channels to the Engineer of Bridges and Buildings.

4. The Engineer of Bridges and Buildings will also make a stated personal examination of all bridges twice a year, besides the customary inspection of special cases, as reported from time to time, and upon the request of the General Superintendent.

5. The condition of the different parts of the bridges must be briefly stated under the appropriate heads on the blanks furnished, and in case of need, further information shall be given in the column of "Remarks and Recommendations."

6. Special reports by letter or telegraph, according to the urgency of the case, must be made by the Inspector or Roadmaster whenever any fault or defect is discovered that may, in their judgment, endanger the safety of the bridge.

7. All ordinary repairs, such as tightening loose rivets and renewing wooden floors on iron bridges, or replacing such parts of wooden structures as have become defective by age and are necessary for the safety of the bridge, shall be done without special orders.

8. When, however, alterations, additions or expensive renewals of any bridge are contemplated and become necessary, they must be reported to the Engineer of Bridges and Buildings, who will then prepare the necessary plans and estimates for approval. R. H. SOULE, General Manager.

DIRECTIONS, GIVING THE MOST IMPORTANT POINTS TO BE OBSERVED WHILE INSPECTING BRIDGES.

Masonry.

1. Each pier and abutment should be carefully looked over, especially those that have already given signs of yielding, either by settling in their foundations or by bulging from the pressure of the embankment they sustain.

2. Examine closely all pedestal stones, looking for cracks or evidence of crushing; they must be maintained level and firmly bedded upon the bridge seats.

3. Keep the latter clean and free from all rubbish and cinder or coal, especially around the iron bed plates.

Iron Bridges.

5. Examine carefully all pedestals, bed plates and rollers and their frames. The bed plates should be perfectly level, the rollers should move freely and their axes should always be kept at a right angle to the line of the bridge. The pedestals should be free from all cracks and flaws, and have a uniform bearing upon all the rollers or upon the bed plate at the fixed end.

8. In the main trusses look most closely at all the tension members, the rods and bottom chords, especially where they are composed of more than one member. If perfect they should all be equally strained per square inch in any one panel, and when they are not, when one member is slack and the other tight, the case should be reported at once. The compression members, that is, the posts and top chords, should be straight, without a bend or bulge, and all the joints should bear closely against each other. The counter rods ought never to be allowed to hang loose, but they must not be adjusted while a load is upon the bridge, and they must not be tightened more than just enough to get a good bearing.

6. *All hangers, by which floor beams or stringers are suspended, must constantly receive the closest attention.* Their bearing around the pins should always be equal and uniform over half the circumference of the latter. If the hangers are made of round or square iron they must be examined with great care in the semicircle where they are bent around the pins, and where flaws or fracture are most likely to occur, and it is of the utmost importance that the nuts on the ends of such hangers supporting the whole floor of the bridge are never permitted to become loose. A white streak painted across the face of the nut and its bearing will make it easy to detect at once any motion in the nut.

7. *The places where stringers are riveted or otherwise fastened to the floor beams*, and which are generally not easy of access for inspection, on account of the wooden floor over them, *must be frequently and thoroughly examined* Here the rivets are most likely to get loose, and the webs and flanges of the beams and stringers are more liable to fail from shearing or crushing than anywhere else.

8. The lateral systems and sway bracing must never b neglected when a bridge is inspected. All the rods should be tight but not overstrained, as the struts are liable to be crippled if too much power is used in adjusting the tension members.

9. Cast-iron parts of all bridges, more particularly when in top chords or in joint boxes, must be closely examined. Should any cracks or breaks be discovered the fact must be at once reported. A hole of ¼ in. diameter if drilled at the end of a crack will frequently stop its extending further.

10. Riveted work should frequently be sounded with a hammer to detect loose rivets; and if they cannot be tightened at once their number and location must be reported on the monthly report.

11. No water must be allowed to collect in the interior of any cast or wrought iron parts; drain holes should be kept open for that purpose and must be provided if they do not exist.

Wooden Bridges.

12. After a wooden bridge or trestle has been in use over three years, a close inspection must be made twice a year as to the condition of the timber, by boring holes in suspicious looking places, especially near the bridge seats and at the ends of stringers and braces. The nature of the boring will reveal the fact if the timber is sound or decaying. Whenever splices exist in bottom chords, and principally in long span bridges where they generally occur in every panel, it is very important to examine them thoroughly and to note if they are pulling apart, which would indicate a weakness or a defective clamp. The braces and counter braces should always have a square and even bearing upon the angle blocks, and the sliding away from their true position, if any, would be sure evidence that the bridge needs immediate adjustment.

13. Tubs filled with water and buckets should be kept constantly on hand on every span of all wooden bridges.

General Conditions.

14. The action of a bridge under a passing train is the best practical test of its stability, and no inspection shall be completed without having made such observation, and without having carefully noted any undue deflection, swaying or twisting of the bridge as a whole or any part thereof.

15. The Roadmaster should carefully measure with an instrument the absolute deflection and swaying of any bridge reported to him by the Inspector as doubtful, and if the movements are excessive must report the fact at once.

16. The tracks on the bridges as well as on the approaches thereto should always be in good line and surface; they should be firmly bedded on the approaches, so as to avoid any undue shock when a train comes on a bridge at a high rate of speed. C. W. BUCHHOLZ, Engineer of Bridges and Buildings.

This form is folded, and on the outer fold is the indorsement for filing under the proper division and date.

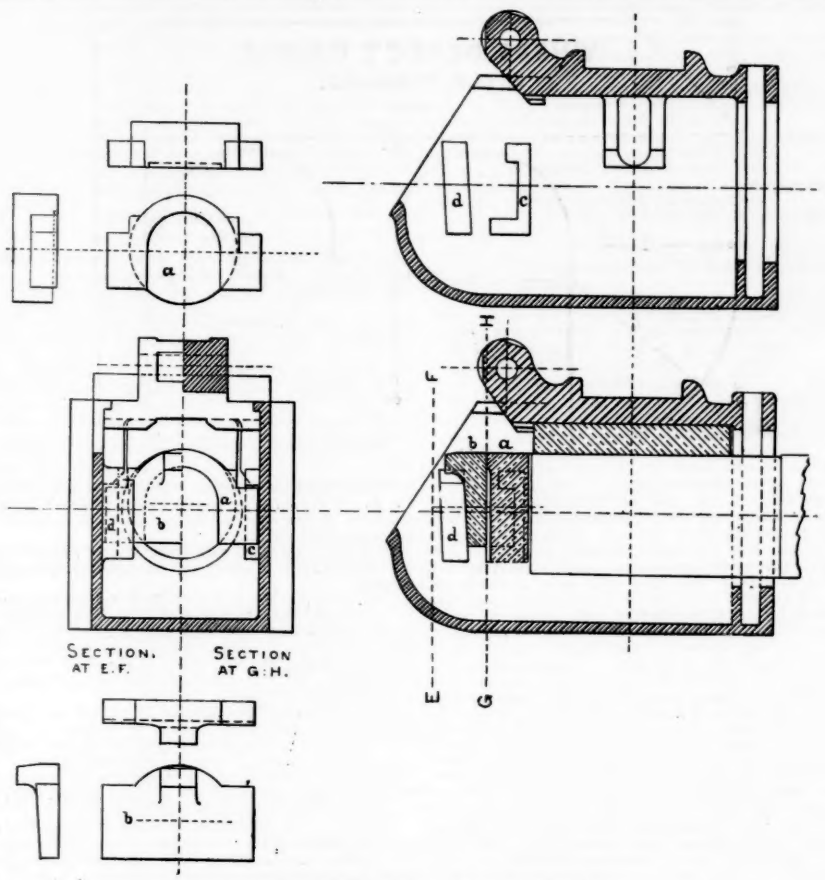
The form for the report of the quarterly inspection of the Roadmaster is precisely the same, except that the sheet is 20 in. × 25 in. to give room for three columns of remarks. These columns bear the headings, By Roadmaster, By Div. Superintendent and By Gen'l Roadmaster, and are signed by these officers respectively, and the whole is signed by the General Superintendent when examined, approved and forwarded by him to the Engineer of Bridges and Buildings.

Johann's End Stop and Journal.

The accompanying engraving represents an end stop and journal invented by Mr. Jacob Johann, Superintendent of Motive Power and Rolling Stock, Texas & Pacific Railway. The device, however, is not patented and is dedicated to public use.

This arrangement was designed to make use of the M. C. B. standard journal box and axle, the only difference being that lugs are cast on the sides of the box to secure the end stop and its key, and that the axle is not swedged down on its ends for the journal.

The following advantages are gained: 1. A largely increased journal with no material increase in weight; and 2. the lateral thrust is taken by an end stop perfectly secured from movement in any direction by the lugs cast on the box and the taper key. This design allows the size of the journal



JOHANN'S END STOP AND JOURNAL.

to be made 4¾ in. by 8 in., thus greatly increasing the bearing surface of the journal and enabling heavier or overloaded cars to be transported with greater security and safety.

The box permits the use of the M. C. B. axle, brass and wedge in connection with this end stop and key, so that if a car having this journal should require to have any of the parts replaced when on a foreign road not carrying these axles and brasses in stock, the M. C. B. standards will not be interfered with.

The idea of an end stop is not new, having been used as early as 1860; but the appliance was defective, inasmuch as there was no provision to secure the end stop from working upwards and out. It is claimed that this device overcomes that difficulty and absolutely secures the end stop from any movement whatever.

In the drawing the end stop is represented by the letter *a*, and may be made of cast-iron with chilled face or of brass, the key *b* fits between the including lug *d* cast on the box and the stop *a* forcing the stop firmly to its place in the lug *c*, also cast on the box. A single journal brass replaces the M. C. B. brass and wedge.

This device has been used for more than a year, and preparations are now being made to put it into general use on the Texas & Pacific.

The Cardenas & Jucaro Railroad.

HISTORICAL.

The first railroad built in Cuba was the work of the Spanish government. It was to connect the capital of the island, Habana, with the city of Güines, situate in a valley then covered with rich sugar estates. The distance was 44 miles. Work was begun in 1835, and the road was opened to traffic in November, 1838. It was located and constructed under the direction of a North American, Mr. Alfred Cruger. It was subsequently bought from the government by the Habana Railroad Company.

The 870 miles of road now in operation on the island are due entirely to private enterprise. Taking the total population of Cuba at 1,500,000, we see that there is a mile of road for every 1,724 inhabitants, and since the area of Cuba = 45,700 sq. miles, there is one mile of road for every 52.5 sq. miles. In England the railroads are about one mile to 1,960 inhabitants, and in the United States one mile to 480.

From 1795 to date the Spanish Government has built only about 153 miles of turn pikes at a cost of about $60,000 per mile. Up to 1873 the railroads had cost $58,000 per mile fully equipped. This high average is due to three lines which of themselves ran up to $80,000 per mile. The remaining eight only average $46,000 per mile. The Cardenas Railroad Company was formed and royal sanction obtained in 1837, and 27 miles were completed before the end of 1843. The Jucaro Company was incorporated in 1841 and a line of 25 miles was opened in 1843. The original capital of the Cardenas Company was $600,000. Of the Jucaro Company $436,000. The Cardenas Company began early the policy which has since prevailed, of paying for the extension of its lines from its profits. Up to 1852, 33 miles of its extension had been built at an average cost of $52,300 per mile, in all $1,734,341, without borrowing a cent. The region traversed was [illegible] forests, but was soon put under cultivation.

The Jucaro Company shifted its terminus to Cardenas in 1854, and in 1857 both companies put an end to their mutual competition and became one, with a combined capital of $4,500,000. In 1867 the new Cardenas & Jucaro Company obtained permission to raise its capital to $8,000,000, with the purpose of further extending its lines. In 1866 the branch to Itabo was completed, with the intention to continue along the coast to Sagua. This idea was abandoned, as competition with the low rates of the coasting vessels is out of the question.

In 1871 the line from Macagua to Sto. Domingo, 32 miles in length, was completed. The village of La Esperanza was reached, and junction with the Cienfuegos & Sta. Clara Railroad was effected in December, 1884, so that the company's trains run to-day from Cardenas to Santa Clara, a distance of 104 miles.

The line from Macagua to Esperanza was surveyed as early as 1864 by government engineers. It was to be the beginning of the Central Railroad, which passing through the centre of the island, and sending off branches to both coasts, was to terminate in St. Iago. The portion constructed by the Cardenas & Jucaro Railroad as far as Esperanza is all that has as yet been accomplished. It has been much agitated, and a few years back was taken up in a serious vein by the Spanish Government, so much so that a French company sent a corps of twenty engineers two years ago, who made surveys at a cost of $60,000. But the company failed to get all it asked for, and the matter is asleep at present. The total mileage of this Central Railroad would be about 680 miles.

It is expected that a point opposite the city of Cienfuegos, in the bay of Jagua, will be reached within two years, and the Júcaro line will then have attained its full growth.

The Cardenas & Jucaro has undoubtedly been and is to-day the most enterprising as well as the soundest financially of the railroad companies of Cuba. Yet its growth has been very slow. Its total mileage to-day is but 211 miles, excluding sidings, etc. It has built on an average 4⅛ miles a year from the day that work was first begun on the original Cardenas road. This last year, however, it has greatly exceeded itself by building 12½ miles from Aguada to Yaguaramas. And, indeed, of late years, under the present management, it has been a much livelier concern, while it has persevered in the traditional 10 per cent. yearly dividend as a minimum. For the financial year ending June 30, 1886, it paid a 12 per cent. dividend. It is this bugbear that has prevented a more rapid growth of the road, as it might have reached St. Iago by this time and have accomplished an exceedingly useful bit of work for the country, though, perhaps, but slightly profitable at first. The total capital of the company amounts to $7,626,130 in shares. There are no mortgage or interest bonds. For several years back the net proceeds have been slightly in excess of 11 per cent. of the capital, and the policy of the management has been to induce the reluctant stockholders, by dint of hard work, to part with the extra 1 per cent. or about $80,000, and devote it to construction of new lines. When the value of these reaches a few hundred thousand dollars it is distributed to the stockholders as shares, which represent a sum actually somewhat below the cost of construction. All subsequent improvements, as ballasting with stone, new rails, etc., are charged to maintenance of way expenses. The cost of locomotives, rolling stock, etc., is not capitalized, but charged to working expenses. Of the $600,000 spent during the last six years in building 35 miles of road, $300,000 has been distributed as shares.

OPERATION.

The ratio of total expenses to gross earnings varies from 0.40 to 0.50, being generally below 0.45. For the year ending June 30, 1886, it was 0.37. This low coefficient of exploitation is the golden calf which the management adores, and in the effort to keep it within the above limits much that is necessary is left undone.

The net earnings may be taken at slightly in excess of 11 per cent. of the capital. The gross earnings amount to $1,500,000, or about 20 per cent. of the total investment. Passenger earnings vary from 20 per cent. to 25 per cent. of the gross earnings. Mails are carried free. Expenses are kept well within $3,000 per mile of track. For the year ending June 30, 1886, they amounted to $2,783.69. Gross earnings per mile vary from $6,000 to $8,000, usually from $7,000 to $8,000. For the year ending June 30, 1886, they amounted to $7,508.83. Passenger earnings per mile of road are from $1,300 to $2,200.

The cost of transportation per ton mile or passenger mile cannot be given, as the reports do not furnish the necessary data. The number of passengers carried yearly varies from 200,000 to 300,000. The ratios by classes, taking first class as unity, are usually 1:3:6. First-class coaches are patronized exclusively by well-to-do whites, the poorer Caucasians take refuge in second-class, and blacks and Chinese rule supreme in third-class. The maxima rates per kilometre for first, second and third-class passengers allowed by the railroad law are $.07, $.05 and $.03 respectively. The company's rates average about $.06, $.04 and $.02, although there are portions of the road where they are greatly in excess; thus, between the stations Medina and Montalvo, a distance of 3.66 kilometres, the fare is $.65, or $.18 per kilometre for first-class and the others in proportion. These anomalies are due to the fact that the schedules for freight, as well as for passenger rates, were originally made taking the interval between stations and not the kilometre as the unit. This interval was assumed as 10 kilometres and for passengers the unit rates were taken as $0.65, $0.50 and $0.30 for first, second and third class respectively. As these intervals as they actually are vary from 10 kilometres, the rate per kilometre fluctuates as an obvious consequence.

The Cardenas & Jucaro road, like all other roads on the island, derives by far the greatest share of its income from the transportation of sugar and its by-products. It is all brought to Cardenas. The direction of maximum traffic is then toward Cardenas. Freight on sugar is not charged by weight or volume, but by the arbitrary units—the hogshead, bag or box. The average gross weights are: 1,800 lbs., 300 lbs. and 500 lbs. respectively. A hogshead of molasses weighs about 2,300 lbs. and holds about 200 gallons. Taking the ton as our unit we find that the rate averages from 8 to 10 cents per ton mile for sugar, and from 6.5 to 9 cents per ton mile for molasses.

The gross earnings from sugar and molasses are about $70,000 per annum for 200,000 tons transported. For the year ending June 30, 1886, there were carried 230,000 tons. The gross earnings from other freight amounted to from $350,000 to $400,000, including through freight from other lines. The freight business is almost entirely at a stand still for seven months in the year, the rolling stock lying idle.

The company has tracks through the city and delivers the sugar at the private warehouses. For this service it makes an extra charge of 20 cents per ton. The unloading of the sugar is done by the receiving party at his expense, the loaded cars being run into his warehouse, unloaded by him of their sugar and reloaded with empty hogsheads to be forwarded to the estates. As a rule sugar estates have sidings from the main track to their mills and the cars are loaded at them. Those who have not send their sugar to the stations in heavy two-wheeled carts drawn by oxen. Some of the sidings are 4 or 5 miles long; altogether there are some 55 such sidings.

Working expenses per annum average as follows: Freight and passenger service, $125,000; repairs to rolling stock and timber structures, $40,000; repairs to locomotives and machinery, $75,000; locomotive expenses, including fuel, $80,000; repairs to permanent way and telegraphs, $200,000; salaries to executive officers, office expenses, etc., $80,000; a total of about $600,000. Of this $400,000 are consumed by labor.

The fuel used for locomotives is wood exclusively. There are burned yearly from 13,000 to 15,000 cords for from 250,000 to 300,000 miles run by both passenger and freight engines, or about 20 miles per cord. The cord costs from $2.75 to $3.25; coal costs $5 to $6 a ton. The greatest number of miles run by a passenger locomotive per year does not exceed 25,000; average, 15,000. Freight engines, maximum, 15,000; average, 10,000.

Passenger locomotive engineers are paid about $125 United States currency a month. The longest run consumes 6 hours work per diem, on the shortest only 3 hours. Freight locomotive engineers get $110 and work from 8 to 12 hours; firemen are paid from $17 to $20 a month.

Nearly all regular stations are water stations. The water is stored in tanks, either of wrought or cast iron, supported on masonry pillars and with five ft. clearance from rail. The supply is drawn from wells by pumps worked generally by windmills or horses, in some cases by hand.

The repair shops are located in Cardenas and are fully equipped for the repairing of locomotives and construction and repairing of cars. Wheels and axles for cars or locomotives are imported from the United States.

EQUIPMENT.

The lomotives are nearly all from the Rogers shops. They vary in weight from 20 to 35 tons, exclusive of tender. The

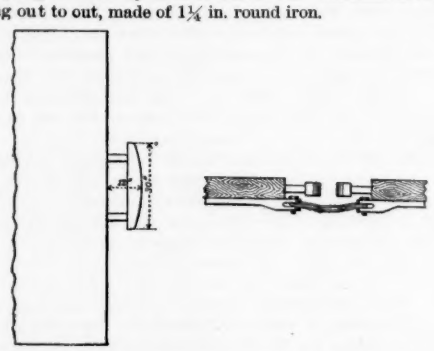
larger ones are of the Mogul type, with cylinders 17 in. × 22 in. There are three archeological curiosities which have been at work for the last forty years. They are employed as switching engines about the city and yards. Many of the locomotives are in a fairly decrepid condition. None of them have injectors. Driver brakes (Eames) are about to be placed on two of the larger freight engines. Two new Rogers Mogul engines, 17 in. × 22 in., arrived in August, 1886. The company owns in all 36 locomotives—three of them switching antiques. A train of 30 cars, or 550 tons, exclusive of locomotive and tender, is the maximum load hauled, but it is a frequent one.

The maximum velocity of passenger trains is 37½ miles an hour; minimum, 25 miles. From 15 per cent. to 20 per cent. of the time is taken up by stops at stations. The velocity of freight trains varies 10 to 18 miles per hour.

Passenger trains are provided with Eames vacuum brakes of the straight air type. Freight cars have no brakes; freight trains carry a brake van at the rear.

Passenger cars vary in length from 50 ft. to 60 ft. over all. Inside dimensions, 42 to 50 ft. × 8 ft. × 8. ft. There are from 2½ to 2¾ sq. ft. of window area per passenger, and a maximum seating capacity of 60 to 72 passengers. Their cost ranges from $2,000 to $3,000. Like freight cars, they are built at the company's shops. Their finish is economically plain. Seats in first-class cars have open cane work seats and backs. In second class, wood throughout. Third class, wooden benches with no backs. In all, seats are placed transversely, leaving a central passageway running the length of the car. Second class cars are provided with two small compartments, one for the mail agent and the other for the conductor.

Such a thing as a metal spring buffer is unknown. Those used for passenger as well as for freight cars are mere wooden blocks. The annexed figure is a fair representation. The coupling is done by a three-link chain. The links are 9 in. long out to out, made of 1¼ in. round iron.



Freight cars are of two general classes, large and small. These latter are relics of the good old times. They have only four wheels. The large cars have two independent bogie trucks of the diamond pattern of four wheels each. The standard wheel is 33 in. diameter on the tread of chilled cast iron. Wheels, axles, journal boxes, springs, etc., are of American make. The great majority of trucks are provided with springs; many there are, however, which have none. Freight cars are built of strong native woods, and are solid and substantial. Platform cars cost $500, and box cars $700. These prices are for the large sizes. The smaller ones are no longer built. Small box cars have a capacity of 480 cubic feet, and weigh 6,500 lbs. on an average. Large ones 1,200 cubic feet, and weigh 16,000 lbs. The small ones have a length over all of 14 ft., and the larger ones of 28 ft. The same dimensions hold good for platform cars. Small platform cars weigh 5,000 lbs.; large ones, 13,500 lbs. Width over all for all kinds 8 ft. Maximum load carried on small ones, 4 tons; ratio of paying to dead load, 1.2 to 1 and 1.6 to 1. Maximum load on large cars, 14 tons; ratio of paying to dead load, 1.75 to 1 and 2 to 1. Cattle cars have the same dimensions as the large box cars. All cars have their floors 48 in. above the track. The trucks have a wheel base of from 4 ft. to 4 ft. 6 in.

(TO BE CONTINUED.)

Standard Wheel Defect Gauge.

The accompanying illustration represents the wheel defect gauge used as standard by the Master Car-Builders' Association. Some discussion as to alterations in the gauge took place at the meetings of the various railroad clubs throughout the country, and the matter was brought before the M. C. B. Convention at Minneapolis.

Changes have been made on the original gauge to suit the alterations made in the rules of interchange at the last convention. Rule 3, section *b*, now reads:

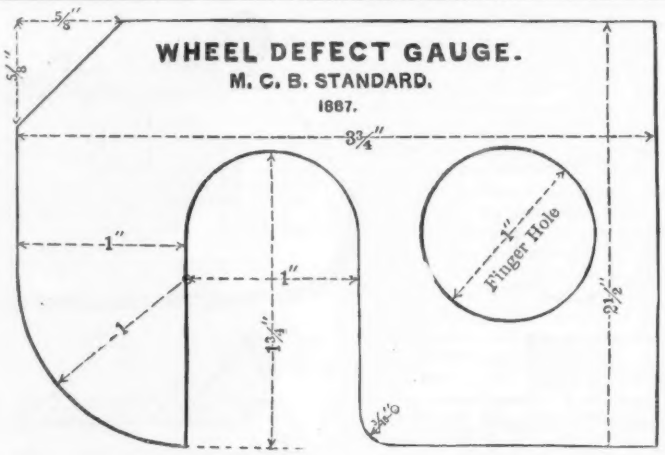
"Cars may be refused for the following defects of wheels: * * * flanges having flat vertical surfaces extending more than 1 in. [⅞ in.] from tread"

The rule formerly read as shown in brackets.

The radius for the root of flange was changed from ⅝ in. to ⅞ in., as shown, in order to facilitate handling, but with these exceptions, no change has been made on the gauge of 1886.

American Trade with New South Wales.

The United States Consul at Sydney reports that, besides the specific duties, the 5 per cent. *ad valorem* duty levied on a very large number of articles which affect American trade in several directions will operate much more injuriously than the amounts would seem to indicate, for when competition is carried on against local industry, an addition to the cost of only 5 per cent. will often turn the scale against imports. This will probably be most apparent in such articles as buggies, carriages, carts, carriagemakers' materials, machinery, wagons, etc. In regard to the 5 per cent. *ad*



valorem tax on machinery, much dissatisfaction is expressed, especially as the cost of American machinery hitherto has been high, and the people prefer it to any other, and it is daily becoming more popular. It is gratifying to note that the American locomotives recently introduced into Australia have given very general satisfaction; and it is not unreasonable to expect that they will soon supersede all others. Until recently the Australians seemed to think that the old-fashioned English locomotive, built upon the le/ermotion principle, was the perfection of mechanical ingenuity, ignoring all the improvements made by the Americans in locomotives during the last forty years. Now the people are beginning to understand that the English engine is too clumsy and heavy, and that it must give way to the American one. It has been noted that the English locomotive wears out too rapidly, and does great injury to the roadway. A recent report of the Commissioners of Railways in New Zealand states that the American locomotives in that colony have more than realized what was expected of them. "The American engines have proved themselves to be both economical and good, and for attention to detail in design and general excellence in workmanship they stand out first in our catalogue of locomotives. American engines I thoroughly believe to be more suited to our lines than anything we can get from England." The American engines in New South Wales are quite as well appreciated as in New Zealand, and Mr. Thomas Higginbotham, engineer-in-chief of the railways in Victoria, is a stanch advocate for their use. In a recent report he states: "I did not go to the states at all prepossessed in favor of American engines; but what I saw there satisfied me that for the light railroads of this country they are better adapted than any other kind." American machinery and appliances for bridge building are also likely to supersede all others. The contract for the construction of the new railway bridge across the Hawkesbury River in New South Wales was awarded to the Union Bridge Company of New York. The construction of this bridge, on account of the great depth of foundation, involving some of the most difficult questions known to science, and the skill thus far displayed in its construction, and the rapidity with which it has been pushed forward, has attracted the admiration and attention of every one interested in the prosperity of the colony. The English engineers in building bridges still adhere to the practice of riveting the pieces, instead of fastening them together with pins as in America. The former plan takes about as many weeks as the latter does days, and does not give half the satisfaction. Another difference between the two methods of bridge building is that the Americans make bridges in workshops and spend little time in putting them up; whereas the English do most of their work on the banks of the stream where the bridge is wanted, but where they have not the steam riveters and other labor and time-saving appliances to be found in the shops.

Train Accidents in June.

COLLISIONS.

REAR.

1st, night, on Southern Pacific, near Florence, Cal., a freight train broke in two and rear section ran into forward one, wrecking several cars and injuring a trainman.

1st, p. m., on Pittsburgh & Western, at Callery Junction, Pa., a passenger train ran into a car loaded with boards, which, owing to the brakes having become loosened in some manner, had run down grade on a siding and projected some distance over the main track. Engineer killed and fireman severely injured.

2d, early, on Louisville & Nashville, near Calera, Ala., a freight train ran into rear of a preceding freight, damaging the locomotive and several cars, killing the engineer and fireman and injuring two tramps who were stealing a ride.

2d, p. m., on Baltimore & Ohio, near Elysville, Md., a freight ran into rear of preceding freight, damaging engine and caboose.

3d, p. m., on West Shore, near Esopus, N. Y., a freight train ran into preceding construction train, damaging engine and several cars. Engineer fatally injured.

6th, on Louisville & Nashville, near Clear Creek, Ala., a freight ran into a preceding freight, which had stopped to take water, damaging engine, caboose and 3 cars.

7th, p. m., on Louisville & Nashville, near Calera, Ala., a rear collision between two freights resulted in considerable damage.

8th, very early, on Pittsburgh, Fort Wayne & Chicago, near Columbiana, O., a passenger train ran into rear of a freight, damaging several cars.

8th, night, on New York, Lake Erie & Western, at Castile, N. Y., a freight ran into rear of a switching freight, doing some damage.

10th, p. m., on Canadian Pacific, near Craigellachie, B. C., a construction train ran into a preceding construction train, damaging engine and several cars and killing the roadmaster.

14th, a. m., on Missouri Pacific, at Dresden, Mo., a freight broke in two and rear section ran into forward one, wrecking several cars.

14th, a. m., on Boston & Albany, in Boston, Mass., a passenger train ran into a freight engine which was switching on the main track.

14th, on Raleigh & Gaston, near Warrenton, N. C., a special passenger train ran into another passenger train, doing some damage, and injuring the conductor and 6 passengers.

14th, p. m., on New York & Greenwood Lake, at Cedar Grove, N. J., a work train ran into the rear of a passenger train, just starting from the station, injuring 3 passengers. The shock of the collision detached the engine of the passenger train, and the men having jumped from it, it started off and ran 10 miles with no one upon it, finally going into the ditch at a curve.

16th, a. m., on New York, Lake Erie & Western, a freight ran into a preceding freight, which had stopped at Southfield, N. Y., wrecking the engine and 6 coal-cars and injuring engineer. A flag was sent back, but owing to a dense fog was not seen soon enough.

16th, p. m., on Baltimore & Ohio, near Ellicott City, Md., a freight ran into a preceding freight, damaging engine and caboose.

17th, a. m., on Pennsylvania Railroad, near Rohrerstown, Pa., a freight ran into a preceding freight, and the engine, several empty passenger cars and a refrigerator car were thrown over an embankment and badly wrecked.

18th, evening, on New York, Lake Erie & Western, in Middletown, N. Y., a freight ran into preceding freight, damaging several cars.

19th, on Chicago, Burlington & Quincy, in Chicago, Ill., owing to a misplaced switch a switching engine ran into the rear of a passenger train, damaging engine and 3 cars, killing a passenger and injuring the engineer.

19th, p. m., on Boston & Maine, near Salem, Mass., a wrecking train collided with a disabled gravel train which it was sent out to assist, doing some damage.

19th, p. m., on Baltimore & Ohio, at Black Oak, Md., a through freight train ran into the rear portion of a mixed train, which had stopped to let off passengers, doing some damage. Four passengers and 2 trainmen injured.

20th, very early, on St. Louis, Iron Mountain & Southern, in Newport, Ark., a passenger train ran into the rear portion of a freight train, several cars of which did not clear the main track, wrecking the engine and several cars and injuring the engineer and fireman. The passenger train was flagged, but the engineer claims he saw no signal.

20th, evening, on Pennsylvania Railroad, a freight train standing on the bridge at Torresdale, Pa., was run into by a following freight, damaging the engine and throwing 2 cars into the Delaware River.

25th, night, on Pennsylvania Railroad, in Philadelphia, Pa., a passenger train ran into a preceding passenger train, wrecking the engine and 1 car, injuring engineer and 3 passengers. The wrecked car caught fire and was burned up.

26th, p. m., on New York, Lake Erie & Western, in Port Jervis, N. Y., a freight ran into the rear of a preceding freight standing in the yard, demolishing the caboose. The engineman would have stopped his train before striking the caboose had not one of the cylinder heads blown out.

27th, very early, on Baltimore & Ohio, near Barrackville, W. Va., a freight, which for some purpose had stopped suddenly, was run into by a closely following freight, wrecking the engine and 12 cars, killing engineer and injuring the fireman. The wreck caught fire and was destroyed.

BUTTING.

2d, p. m., on New York, Philadelphia & Norfolk, at Salisbury, Md., a butting collision between two freights, owing to a misplaced switch, demolished both engines and wrecked several cars.

4th, on Chicago & Northwestern, near Freeport, Ill., a butting collsion between two freights wrecked both engines and several cars.

4th, noon, on Louisville, Evansville & St. Louis, near New Albany, Ind., a butting collision between a freight and a construction train, owing to misunderstanding of orders, wrecked both engines and fatally injured an engineer.

5th, night, on Western & Atlantic, in McDaniel, Ga., a butting collision between two freights completely wrecked both engines and several cars. It is stated that one of the engines became unmanagable.

6th, early, on Asheville & Spartanburg, near Spartanburg, S. C., a butting collision between a passenger and a gravel train damaged both locomotives.

9th, early, on Pennsylvania Railroad, near Jamesburg, N. J., a butting collision between two freights, doing some damage.

17th, a. m., on Pennsylvania Railroad, at Parker's Landing, Pa., butting collision between a passenger train and a freight; 2 locomotives and 15 cars were piled up in a bad wreck. Fireman killed, 3 trainmen and several passengers injured. The freight was using a crossover track on the passenger train's time.

18th, early, on Philadelphia & Reading, at Montoursville, Pa., a butting collision between two freights wrecked both engines and several cars.

18th, a. m., on Illinois Central, near Makanda, Ill., a butting collision between a freight and a construction train damaged both engines and several cars. Six cars of freight caught fire and were burned up.

19th, on Grand Rapids & Indiana, the caboose and several cars of a freight train became detached and ran back down grade and collided with a passenger train near Richmond, Ind., wrecking the engine and the runaway cars, and slightly injuring 3 men who were asleep in the caboose.

28th, p. m., on Nashville & Chattanooga, near Wauhatchie, Tenn., butting collision between two freight trains, badly damaging both engines and two cars.

28th, p. m., on Missouri Pacific, near Denison, Tex., butting collision between two freights, damaging both engines and eleven cars.

CROSSING.

6th, night, a Baltimore & Ohio freight ran into a Cleveland, Columbus, Cincinnati & Indianapolis freight at the crossing in Shelby, O., piling the engines and 25 cars up in a bad wreck. The Baltimore & Ohio train had broken in two and the engineer was trying to connect the two sections when the accident occurred.

17th, night, at Washington Court House, O., a Columbus & Cincinnati Midland freight car broke loose and ran down grade some distance, when it collided with a Dayton & Ironton freight train, wrecking 6 cars.

18th, at Richmond, Ind., a Chicago, St. Louis & Pittsburgh freight train collided with several Cincinnati, Hamilton & Dayton runaway freight cars, doing some damage.

21st, p. m., the engine of a Burlington & Missouri River switching freight ran into the engine of a Union Pacific freight at the crossing near Lincoln, Neb., damaging both engines and several cars, and killing a workman.

21st, p. m., on Philadelphia, Wilmington & Baltimore, in Harve-de-Grace, Md., a north-bound passenger train approaching the end of the bridge over the Susquehanna River, crashed diagonally into the side of a slowly moving south-bound passenger train just as it was crossing the switch from the single to the double track, wrecking an engine, baggage and 2 parlor cars. One passenger killed and 20 injured. The engineer of the train at fault claims that the air brakes refused to work.

DERAILMENTS.

DEFECTS OF ROAD.

3d, on Maine Central, near West Falmouth, Me., engine and tender of a gravel train were thrown off a new piece of track by the spreading of the rails and upset. Engineer seriously and fireman slightly injured.

5th, p. m., on Philadelphia & Reading, near Askew Bridge, Pa., several cars of a freight were derailed by a defective switch.

10th, a. m., on Providence, Warren & Bristol, near Providence, R. I., the locomotive of a switching passenger train was derailed in crossing over a frog.

10th, night, on Richmond & Danville, near Durham, N. C., a car of a passenger train was derailed by a defective switch.

22d, early, on Baltimore & Ohio near Terra Alta, W. Va., a passenger train was thrown from the track by a broken rail, injuring a trainman and 2 passengers and killing a tramp.

DEFECTS OF EQUIPMENT.

6th, p. m., on New York Central & Hudson River, near Coldwater, N. Y., several cars of freight were derailed by a broken axle.

6th, p. m., on Central Pacific, near Emigrant Gap, Cal., 3 cars of a freight were derailed by a broken wheel.

13th, early, on Chicago & Northwestern, near Iron Mountain, Mich., several empty coke cars were derailed and wrecked by the breaking of a draw bar, killing a brakeman.

13th, p. m., on Cheraw & Salisbury, near McFarlan, S. C., the engine and one car of a freight were derailed by a broken wheel under the tender and wrecked; fireman injured.

27th, p. m., on Philadelphia, Wilmington & Baltimore, near Northeast, Md., several cars of a freight derailed and wrecked by a broken wheel.

30th, p. m., on Cincinnati & Muskingum Valley, near Zanesville, Ohio, passenger train derailed by broken axle and thrown down a bank, baggage master badly hurt.

NEGLIGENCE IN OPERATING.

5th, night, on Baltimore & Ohio, near Terra Cotta, Md., a passenger train was derailed by a misplaced switch.

7th, p. m., on Cincinnati, Washington & Baltimore, in Cincinnati, O., the engine and 4 cars of a passenger train were derailed by a misplaced switch and went over an embankment.

7th, p. m., on Fitchburg road, at Pownal Station, Vt., 2 cars of a passenger train were derailed at a cross-over switch and overturned, injuring 11 passengers more or less severely.

9th, p. m., on Central of New Jersey, an engine and 5 empty cars of a freight ran into an open draw over Newark Bay, the remainder of the train being saved by the derailing of one of the cars. The engineer and fireman jumped off before the engine went over, the former being severely injured. There was a heavy fog and drizzling rain at the time.

13th, night, on Rome, Watertown & Ogdensburg, at Summerville, N. Y., the engine and 1 car of passenger train were derailed by a misplaced switch, doing some damage.

17th, p. m., on Lake Shore & Michigan Southern, in Chicago, Ill., several cars of a switching freight, run on to a short spur at too great speed, reached the end of the track while still under considerable headway, and, continuing, knocked down the gate-keeper's tower and a switch shanty, severely injuring the gate-keeper.

19th, early, on New York, Lake Erie & Western, in Susquehanna, Pa., passenger train derailed by misplaced switch.

20th, p. m., on Boston & Albany, in Boston, Mass., the forward car of a train of empty passenger cars being pushed into the station, ran away from the rest, apparently not having been coupled to them, and struck the block at the end of the track with such force as to throw the body of the car over it and some 50 ft. beyond, demolishing the brick walls of the station building and bringing up against one of the iron columns inside the waiting room.

21st, on Baltimore & Potomac, an engine and several cars of a freight were derailed, near Stony Run, Md., where trackmen had removed rails for repair.

29th, a. m., on Southwestern of Georgia, near Bath, Ga., freight derailed at a point where a rail had been removed for repairs and no flag put out.

UNFORESEEN OBSTRUCTIONS.

4th p. m., on Utah & Northern, at Woodin Station, Utah, a passenger train ran into a herd of cattle, ditching engine and 4 cars, and seriously injuring engineer and fireman.

6th, night, on New York Central & Hudson River, near Mt. Kisco, N. Y., a milk train ran over a yoke of oxen and 12 cars were thrown from the track and wrecked.

24th, on Spartanburg, Union & Columbia, near Union, S. C., a passenger train ran into a land slide, derailing engine and one car.

26th, p. m., on Baltimore & Ohio, in Frederickton, Md., several cars of a passenger train were derailed and considerably damaged by a stone which had in some way become wedged in beside the track. A locomotive standing near by was also damaged.

27th, p. m., on Boston & Albany, in Coltsville, Mass., a gang of men in rolling telegraph poles off a platform car while the train was in motion dropped one point first and the butt end was forced back and derailed 2 cars, severely injuring a workman.

29th, on Chicago, Milwaukee & St. Paul, near Gault, Mo., car in construction train derailed by a sleeper falling off and tipping up the body of the car; 1 man killed, 2 injured.

29th, on International & Great Northern, near Austin, Tex., engine of freight derailed by running over a cow; engineer and fireman injured.

UNEXPLAINED.

3d, p. m., on Philadelphia & Reading, at Sanatoga Station, Pa., 30 cars of a coal train were derailed and badly wrecked.

4th, early, on New York, Lake Erie & Western, near Middletown, N. Y., 11 cars of a freight were derailed.

5th, a. m., on Little Rock, Mississippi River & Texas, near Pine Bluff, Ark., 11 cars of a freight were derailed and wrecked.

7th, p. m., on St. Louis & Hannibal, near Frankford, Mo., passenger train derailed, injuring 2 trainmen and 2 passengers.

9th, p. m., on Detroit, Lansing & Northern, near Merrill, Mich., the engine and baggage car of a passenger train were derailed and badly wrecked, injuring 3 trainmen.

10th, a. m., on New York Central & Hudson River, at Spuyten Duyvil, N. Y., 2 sleeping cars in an express train were derailed at a facing point split switch. One of the cars was tipped over and dragged some distance on its side, injuring 2 passengers.

10th, p. m., on Jacksonville Southeastern, near Carrollton, Ill., a passenger train derailed, wrecking mail and baggage cars.

12th, a. m., on Houston, East & West Texas, near San Jacinta, Tex., a freight was derailed and wrecked; engineer seriously and fireman fatally injured.

16th, p. m., on Baltimore & Ohio, near Ellicott City, Md., the engine of a passenger train was derailed.

21st, p. m., on Delaware & Hudson Canal Co.'s road, near Saratoga Springs, N. Y., 3 cars of a freight derailed and wrecked, blocking the track for some time.

24th, on Evansville & Terre Haute, near Riley, Ind., 8 cars of a freight derailed.

24th, p. m., on Southwestern, near Box Spring, Ga., the caboose of a freight train was derailed and overturned, killing the conductor.

26th, night, on Buffalo, Rochester & Pittsburgh, near Warsaw, N. Y., 17 cars of a freight derailed in a deep cut, making a bad wreck. A brakeman seriously injured.

30th, on Prospect Park & Coney Island, in Brooklyn, N. Y., the engine of a passenger train derailed.

OTHER ACCIDENTS.

7th, on Baltimore & Ohio, in Chester, Pa., the engine of a freight exploded its boiler, killing 1 man and seriously injuring a number of others. The station and several other adjoining buildings were considerably damaged.

8th, p. m., on New York, New Haven & Hartford, in Hartford, Ct., the engine of a freight train ran against a slack rope, extending from the top of a derrick to a tree, tearing off the smokestack, sand box and one side of the cab, injuring engineer.

19th, p. m., on Boston & Maine, near Salem, Mass., the engine of a gravel train was disabled by the breaking of a wheel.

TECHNICAL.

Electric Car Lighting.

It is stated that Mr. George M. Pullman, who has just returned from England and is now at Long Branch, proposes to introduce in this country the system now in vogue on one or two of the English railroad lines of storing electricity for the lighting of the cars by power taken from the trucks. He has brought an expert over who will soon set to work on a series of experiments at the car shops at Pullman, Ill.

The Westinghouse Infringement Suit.

The suit brought by the Westinghouse Air Brake Co. during the Burlington tests against Mr. J. F. Carpenter for infringement of the brake hose coupling patent was to have come up on motion for preliminary injunction in the United States District court at Keokuk, Ia., July 19, but at the request of the counsel of the Westinghouse Co. was postponed until October next. The patent on which this application for a preliminary injunction is based, expires, we understand, May 1, 1888.

Horses on English Railroads.

English railroads do the major portion of their own carting, collecting and delivering freight at the freighters' doors. One of the largest companies, the Midland, have in constant employment no fewer than 3,200 horses; and of these 1,000 are located in London.

Some of these horses are, however, employed in switching cars, at which business a heavy horse weighing about 2,000 lbs. can do good service. They soon become very expert, and start the car by standing with the trace chain slack, and then without moving their feet, throw their shoulders forward when their weight starts the car. They also learn to judge when the car has acquired sufficient speed, and step aside without a word of command, letting the cars come gently together.

The Bolan Pass Railroad.

The Calcutta papers state that the Bolan Pass Railway is now open for 120 miles into the pass, and that passengers are carried to Quetta, 80 miles. The broad gauge is broken at Hirokh by 9 miles of narrow gauge, and there is then 25 miles of broad gauge line to Quetta. It is thought that it will require a year and some 15 lahks of rupees, or about $750,000, to convert this 9 miles to broad gauge. This is a sample of the inconvenience caused by break of gauge. The narrow gauge was in India as elsewhere adopted on the score of economy against the advise of engineers. The Quetta line was begun during the Afghan war, when narrow gauge rails and rolling stock was most available, but it was subsequently determined to change the gauge of connecting lines in India, which in turn obliges the gauge of the Bolan Pass line to be changed.

Wire Nails.

The manufacture of wire nails was first undertaken in this country about 17 years ago, when a German mechanic brought over and operated a half dozen machines for their production in Kentucky. Wire nails, however, did not grow at all satisfactory in public estimation until after the big nail strike in 1885, when wrought nails became so scarce that wire nails had to be resorted to. A boom being thus given to them, improved machines for their manufacture immediately seized on American inventive genius, and as a result several kinds of machines cropped up, probably the best of which was one constructed by a man named Smith, of Brooklyn, N. Y., which excelled the German machine 20 per cent. in its speed of production. The German machine is now putting out 132 ten-penny wire nails per minute, while the Brooklyn machine is running out 170 per minute. But at the Hartman Wire Nail Works, Beaver Falls, Pa., there is a newly-invented machine now running that produces 200 ten-penny nails per minute. The inventor is a Prussian mechanic named Henry Happe. This machine has been leading all others in the shop by 25 to 30 per cent., and the nails it produces are uniform, straight and well shaped. Messrs. Happe and Rohrkaste have applied for a patent.—*Industrial Journal.*

Western Society of Engineers.

At the meeting of July 5 a resolution was adopted authorizing the president to appoint delegates to a convention of Engineering Societies whenever such a convention shall be called by the Board of Managers of the Association. Also a resolution to authorize the librarian to prepare a catalogue of the library of the Society. A paper, "Notes on Concrete," was read by Mr. John Lundie and discussed.

Consolidation of Gogebic Companies.

According to the *Iron Trade Review*, nine of the mines on the Gogebic range, mostly belonging to the Moore-Benjamin syndicate, have been consolidated under the title, Lake Superior Consolidated Iron Company, Ex-Secretary William Windom President. The price paid was $3,260,000. The capital stock of the company will be $10,000,000, and $6,000,000 6 per cent. first mortgage bonds, running 15 years, will be issued to develop the mines and build 10 steel propellers for carrying ore. The company is also negotiating for additional properties. Another concern, the Bessemer Consolidated Iron Company, is proposing to buy mines at the cost of $2,320,000. This is composed of Eastern capitalists, and a meeting of the stockholders of the various mines is to be held Aug. 9, to decide if the terms offered will be accepted.

The Coke Industry in West Virginia.

The Montana works, 5 miles from Fairmont, W. Va., on the Fairmont, Morgantown & Pittsburgh branch of the Baltimore & Ohio, has 25 ovens in operation, and 200 ovens are being constructed. At Clemens, 9 miles below Fairmont, 100 ovens are going up.

Business in Anniston.

The growth of this town since its first furnace was put in blast by the Woodstock Iron Co. in 1873 has been continuous and healthy. The town was started on the strength of the possession by the Woodstock company of 60,000 acres of brown hematite ores assaying:

Peroxide of iron	82.26
Sesqui protoxide manganese	6.50
Phosphorus	0.090

giving:

Metallic iron	57.50
" manganese	4.85

and a pig iron containing 0.02 to 0.04 phosphorus.

The smelting furnace was followed by a cotton mill of 11,700 spindles, giving employment to 320 hands, the building of additional furnaces, the removal of Noble Bros.' car-wheel, rolling mill and steam forge works from Rome, Ga., and the Georgia Car Co. works to Anniston. Now, according to the *Age of Steel*, the Woodstock company have increased their capital to $3,000,000 and their blast furnaces to six, have bought the property of the Cababa Mining Co. and 15,000 additional acres of adjoining coal lands and are building about 500 coke ovens.

A large pipe foundry to employ 900 hands is being built, and a steel works is nearly ready to make ingots. A large fire-brick factory is started and the Alabama Car Co have increased their capital to $1,500,000, and propose to make daily 30 freight cars and 10 passenger coaches and 10 locomotives monthly. The works will give employment to 1,600 men and be the largest of the kind in the South. Besides which, Anniston capitalists have organized a company to build a road from Anniston by way of Gadsden to Altala, on the Queen and Crescent route.

A New Express Locomotive.

The Hinckley Locomotive Works, of Boston, are building an express locomotive with a single pair of driving wheels. This engine is built to the order of a Boston syndicate, and is intended to run the fast express, the Flying Yankee, on the Boston & Maine. The engine will not be completed until Sept. 1. It is understood to embody many new features, and considerable interest will be felt in its performance. Any difficulty from slipping can probably be overcome by the use of the sand blast now successfully used on many English roads and undergoing trial on the Chicago, Burlington & Quincy. The sand being thrown on the rail by a jet of compressed air, cannot be blown off before the wheel reaches it. Experience in England goes to prove that the success of engines with a single pair of drivers depends entirely upon the character of the sand supplied. If dry and delivered fairly on the rail close to the driving wheel tread, no time is lost from slipping, even where the tractive power of the engine is 94 lbs. per lb. pressure on the pistons.

Interlocking at Crossings.

The Rock Island & Lake Shore roads and the Union Stock Yard Co. have filed an application with the Illinois Railroad and Warehouse Commission for an examination of the interlocking switch and signal system constructed by them, and asked permission to run trains over the crossings without stopping if the system should be approved by the commission.

The Rote Brake

A train of fifty loaded cars equipped with the Rote automatic buffer car brake has lately made a trip from Chicago to New York via the Chicago & Atlantic, New York, Pennsylvania & Ohio, and the Erie. The engine was equipped with the Beal driver brake. The trainmen report it a success, and as good on a freight train as an air brake on a passenger train. To stop a train all that is required is for the engineer to shut off. The cars crowding together, a spring in the drawhead is shoved back which sets a shaft against the car axle and sets the brakes at the same time the entire length of the train. It is also arranged that in switching cars in a yard, by turning a lever on the side of the car, it can be thrown out of gear, so as to set the brake by hand. Another train of the same kind will leave Chicago in a few days when all the cars will be coupled together for a return trip and further experiments made.

Indurated Fibre.

The Union Indurated Fibre Co., at their factory at Mechanicsville, N. Y., are now manufacturing tubes or pipes from wood fibre by a patent process. They have arranged with the Board of Electrical Control, of New York City, which has charge of laying underground all wires, electric light, telephone and telegraph, for a large quantity of these tubes, and are now negotiating with one of the largest natural gas companies for an extensive supply of pipes.

The claims made for the pipe are very broad. Tests made in connection with the Board of Electrical Control, or Subway Commission, showed the material to have a tensile strength of about 1,100 lbs. to the inch, and 2½ in. pipe will stand 80 to 100 lbs. pressure to the square inch. The tubes are light, strong and cheaper than iron. They are now made in lengths of about 5 ft. and threaded with the standard iron pipe thread, so they can be connected with iron pipe. Two and one-half inches is the smallest size now made, but the company will soon be in shape to fill all orders for all sizes from 2 in. up.

A New Boiler Compound.

A boiler compound chiefly composed of a heavy natural oil free from tar is being largely used near Pittsburgh. A peculiar mineral imported from Germany is mixed with the oil and is said to prevent foaming. The penetrating power of the oil separates the scale from the plates. It is claimed that this compound has no chemical effect whatever, but acts by giving a slightly greasy coating to the inside of the boiler and the tubes, so slight as to be scarcely perceptible, like the touch of a sweaty hand on a window pane, but sufficient to prevent adhesion. The water in the boiler becomes slightly greasy, so preventing crystallization or cementation of the mineral contained in the water.

A quart of the compound is placed in the boiler after washing out, at a cost of about ten cents. It has been used for more than a year on the Kansas City, Fort Scott & Gulf and on the Central Iowa, where the water is very bad. Mr. Player, of the latter road, states that his engines, previous to the use of the compound, required removal of the tubes every four months on account of scale. After using the compound the flues are as clean as new, after running for one year. It is claimed that experience on several Western roads shows that it prevents foaming when alkali water is used. This compound is manufactured by the Pittsburgh Boiler Scale Resolvent Co., of Pittsburgh, Pa., and is used on several local steel and iron works and on numerous railroads.

RAILROAD GAZETTE

Published Every Friday,

At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The numerous experiments now being made with oil fuel under locomotives indicate the increasing interest felt in this question. It is evident that a fuel that for equal work done weighs only half as much as coal possesses obvious advantages, and the easy method of firing, absence of sparks, cinders and clinker are also great incentives to its use. The fact, however, that the price of petroleum is virtually controlled by one great monopoly will render uncertain the economical side of the question. It is also probable that if used extensively under boilers the enormous consequent increase in the quantity of oil consumed would materially enhance the price. The total production in the census year was estimated at 24 million barrels of crude oil, and the accumulated stocks 13 million barrels. The total production at the present time is estimated to be at the rate of 31 million barrels per annum. Less than one-fourth of this amount is produced in the Lima oil field, where the most suitable oil for fuel is found. Assuming that three barrels of oil are equal to one ton of oil, the total production would be equivalent to 10 million tons of coal (even assuming that all the oil could be used in place of coal, which would, of course, not be the case). The annual train mileage of the country will, this year, probably exceed 600 million miles. At the moderate estimate of 25 miles to the ton of coal, the locomotives of this country would burn 24 million tons of coal, or more than double the equivalent production of petroleum. Any thing approaching such a gigantic change in the consumption of crude petroleum would revolutionize the whole industry, and would, of course, so increase the price that oil would be the more expensive fuel. The consumption of oil is, therefore, likely to be limited until some material change occurs in the producing capacity of the oil wells.

A recent accident due to an open switch on the Chicago, St. Paul, Minneapolis & Omaha resulted only in the wreck of the engine, tender, baggage and express car, but it is only too probable that the season of the year alone prevented another Rio disaster. It is evident that the engineer of the approaching train received an insufficient warning that the switch was open. The use of a clearly visible and unmistakable semiphore signal interlocked with the switch and placed some distance in front of it would in all human probability have averted this accident on the Chicago, St. Paul, Minneapolis & Omaha. Such accidents will continue to happen as long as the absence of proper signals forces the engineer to trust wholly to luck in approaching a switch. It is only human nature that every year so many hundred or thousand men will forget to set the switch right, and in a certain percentage of these cases a serious accident will occur. Ordinary prudence would suggest that some efficient method of warning an approaching train should be used and connected with every switch opening on a main line on which fast trains are run. The precautions really taken are, however, too often merely nominal, the switch light or target becomes visible too late to be of service, and the wreck occurs before any known system of brakes could stop the unfortunate train. The whole affair becomes a game of chance; if the switch is set right, well and good; if it is set wrong, a coroner's inquest.

Attention is called to the orders and directions for bridge inspection of the Erie, and to the form for reports, as printed in another column. It will be seen that the orders call for monthly inspections by men employed for that purpose, for quarterly inspection by roadmasters, and for semi-annual inspection by the Engineer of Bridges and Buildings. The directions for inspection are very thorough and precise, and the form of report is such that the current history of each bridge is completely set forth in such shape that it can be readily followed. The chain of responsibility is also made complete from the engineer down, and if hereafter a bridge on the Erie falls it will be for the engineer to set himself right before the public and the directors. As a matter of form of record it might be a convenience to keep a ledger account with each bridge, according to the plan of Mr. D. J. Whittimore, posting the record of each structure from the quarterly or monthly reports on to a special page in the ledger. In this way the record could be more conveniently displayed and followed than in the reports folded and filed. That, however, would be rather a luxury than a necessity. But it is one thing to organize and formulate a system of work, and another thing to have it thoroughly carried out; and this last is much the hardest part. The good intentions of the Erie officers are expressed in this admirable system of inspections and reports. Only discipline and vigilance can make them effective.

Some of the Western newspapers, and undoubtedly some of the Western railroads, are a good deal dissatisfied with the decision of the Inter-state Commission in the matter of the refusal of the trunk lines to sell through tickets over those roads that insisted on continuing to pay commissions to ticket agents. The Chicago *Tribune* takes the ground that "the rights of the people have thus far been steadily ignored" by the Commission, and asserts that this particular ruling "must be corrected, if necessary, by a change of the law." Possibly there is a political animus back of the *Tribune's* disapproval of the ruling, as, no doubt, there is back of the persistent efforts of its New York namesake to disparage and discredit the Commission. To talk of the "rights of the people" in this case is quackery. The trunk lines stood ready to make fair business arrangements with all Western roads, as they had already made with certain of them; and those roads which refused to accede to the conditions of agreement alone stood in the way of accommodating the public. That the commission system has been a great evil there is no doubt. Whether or not the trunk lines have the right, under the present law, to force its abolition by the means they have taken is a question on which the Inter-state Commissioners are not agreed. Probably it is a question which will have to be settled in the courts. But there is no reason for injecting "the people" into the dispute.

A letter in another column shows that English railroad employés have complaint to make against the tests of eyesight, and that there as here, there must be still some misapprehension as to the nature of the tests. We must much doubt whether properly qualified examiners in England ask the candidate to *name any color*, as the tests do not call for this. It may be that color names were asked for by ignorant examiners, but even then it would have nothing to do with the seeing black spots on a card, the test for the form sense or power of eyesight. While of course the black spots can be *counted* by those unable to read, we wonder the ordinary test letters were not used. Perhaps it has been found in England as here that the men learn them by heart beforehand. Still, as is now done, the individual letters can be shown. By the recent law in Alabama, dots are to be used only with those unable to read. We quite agree that if the English railroad servants have been called upon to *name colors* in proof of their color sense, they have a grievance which should be redressed. It would not, however, be redressed by being tested with flags and lanterns, but by having properly qualified examiners apply the tests they do without names. Experience of the most practical kind has here shown the worthlessness of the attempted tests with flags and lanterns, and superintendents and commissioners are gradually learning this. The Legislature in Massachusetts refused the petition of the employés to confine the tests for form and color to the signals used, after several years of hammering over the subject in committee hearings. The Alabama laws also exclude all such attempts. An article from the London *Lancet* in another column, shows an additional phase of the discussion in England.

The trouble on the Reading is not yet over, but the men seem determined to prevent the working of the system lately introduced. It is unfortunate that they should thus array themselves against the public interest, and not that alone, but against their own interests; for it certainly is in the long run for the interest of the men that those who are physically incompetent for responsible positions should be weeded out and kept out of such positions. The statement is now made that of the Reading employés so far examined, 10 per cent. have failed in the test for power to distinguish forms at a distance. If that is true it was high time to make the examinations.

The verdict of the coroner's jury in the case of the Italian trackmen run over on the Erie appears to be warranted by the facts. To take a score poor countrymen who have probably never before seen a railroad, and place them on one of the most dangerous services about a railroad is to needlessly risk their lives. When these men are totally ignorant of the language, and the spot at which they are at work is just beyond a rock cutting, where frequent express trains are running, the utmost vigilance and watchfulness are necessary. There seems, however, to have been but very moderate vigilance. It is not practicable for the chief engineer or the principal assistant to go out with every track gang, but it is practicable to have the gang adequately watched and the engineman warned that he is approaching a place where track work is in progress. These men might have done good service in a less dangerous occupation on the railroad, and a little consideration would have suggested that they should not have been exposed at an exceptionally dangerous spot to the risk of a trackman's calling until they had learnt the language and acquired some knowledge of railroads and could take care of themselves. The care and thought however bestowed on these poor immigrants may be gauged from the fact that the company did not even take the pains to ascertain their names. Italians, though dirty, and speaking broken English, are hard working, peaceable and contented laborers. Judging from the frequent cases in which they are maltreated, as in this case, or by being defrauded of their pay by some absconding contractor, Italian laborers are too often regarded as a cross between a machine and a beast of burden and are treated accordingly. The offense of the Erie in this case is not uncommon, and therein lies the reason for our sermon. The Erie got caught, that is all, and those who have been more lucky will do well to read and profit by the lesson.

The Wabash Sleeping-Car Robbery.

We are speaking of a modest little affair which lately occurred on the Wabash Railroad. It is all the more important because it was a modest, unassuming little affair, such as might occur, so the circumstances indicate, on any road.

The General Manager, the General Freight Agent and Assistant General Passenger Agent Crane left St. Louis, so says the report, at night, for Chicago, in the Manager's special car. At about an hour before daylight Mr. Crane was rudely awakened by a rough shake, and found a masked man standing beside his berth with a big revolver, which was pointed directly at the passenger agent's head. "Now, then, pass over your money mighty quick," said the robber, "and don't make any noise, or I'll shoot the top of your head off." Mr. Crane passed over his money and, in doing so, exposed his gold watch and chain. "Give me that watch and chain," continued the robber, and Mr. Crane passed over the watch and chain. The robber then looked around the car and, finding no one, started to leave. He accidentally stumbled in the aisle and aroused the porter. He covered that worthy with his revolver and threatened to kill him, and the negro became as docile as a lamb. Mr. Crane arose and pulled the bell, which seemed to be just what the robber wanted, for, before the train stopped, he jumped off with his booty and escaped.

Who is the party legally responsible to a passenger who suffers a theft or a loss of valuables from a sleeping car? Does he bear his own risk and take his own care as to all hand baggage or money and jewelry carried on his person? This is the general rule between passengers and carriers, and in the early cases in which suits for sleeping car losses or thefts were brought against the carrying companies—the companies which did the hauling—the decisions of the courts generally were that as to the things carried on the person they took no special responsibility, but the passengers must watch them.

But the arrangement generally made throughout the country is that the sleeping car belongs to a distinct

company, and that the company is not a mere carrier, but enters into special agreements with passengers, for an extra price, to carry them in a degree of comfort and their things in a degree of security, corresponding to the wishes of the persons riding at rest or asleep, and the argument for passengers has been that this contract includes a duty of excluding thieves and of guarding against losses. Whether this is sound law is a general and extensive question. It does not arise precisely in the Wabash case, because there the party seems to have been a party of agents of a railroad traveling on its business in an official car, instead of one of fare-paying passengers. But it is arising quite frequently.

Years ago a suit was brought by Smith, who put himself in his little bed in a Pullman car between Chicago and St. Louis, having with him somewhat more than $1,000, and who slept quietly all night; but in the morning the money was gone. Blum, traveling with a larger sum between Humboldt and Memphis, did the same, except that instead of holding the fort continuously all night, he left guard for a few moments to get a drink of water; at which time, probably, the thief despoiled him. In these cases the lawyers contended that the sleeping car companies were common carriers of new form, or were landlords of moving inns, but the courts said "not so; these companies let a berth for the night under an obligation that it shall be clean and comfortable, and that it shall be reasonably watched and guarded for security of the passengers and of his things with him."

Diehl, an Indiana man, was more successful in his suit against a sleeping car company, because his lawyers did not content themselves with proving that the money and watch were lost; they showed that the company had neglected reasonable ordinary precautions to guard them. They showed that for more than eighty miles of a night trip, the train of four cars was in charge of only one conductor. Though each sleeping car had a porter, yet these porters had too much work to do to leave them time for keeping watch against thieves. They also showed that there was nothing particular to hinder an intruder from parting the curtains and reaching in; also that no effort was made to notify passengers that the company would not be responsible for valuables; also that Diehl was an experienced railroad man and traveler, and packed his money and watch carefully in his vest when he laid it aside at night; also that this vest was found next morning in a section near by that of the passenger, the occupant of which arose very early and left the train, hurriedly, at a way station. Quite likely he took the watch and money; this, however, was not ascertained. What the Court decided was that though the sleeping car company is not a common carrier or an innkeeper, yet that in this case it was liable for lack of keeping a guard or watch against sneak thieves. The judge said he considered passengers by sleeping cars entitled to the same protection in this respect as are passengers in steamboat berths and staterooms; whom every one considers entitled to reasonable care against intrusion of thieves. A very similar decision was noted in the law column of a recent number of the *Gazette*. What makes the decision more instructive is that during the very next year a suit was decided in New York in which a passenger's money was lost from his vest pocket lying in his berth in a sleeping car, under circumstances very similar, except that there was nothing to show any failure of care on the part of the car company; nothing to show lack of conductors, unreasonably overworked porters; a suspicious passenger running away; insufficient notice or the like; nothing, said the judge, but that "the wallet was there at night, in the morning it had disappeared." The company was held not liable because there was no proof of its negligence.

Thus the quite well settled rule of law is that a sleeping car company is not an insurer of the valuables which its passengers may carry, but that it is bound to take reasonable care against losses and thefts.

Can these companies substitute any cheaper or easier means of shielding themselves from liability? None are suggested. The plan of posting up notices that the company will not be liable for personal property in berths has been tried, but the courts have decided that such notices have no effect upon passengers who have not read them; and the fact of reading is not easily proved. The duty of the company consists not in giving notice but in taking pains to prevent thefts. Upon the whole, the effect of the decisions is that the company may be held liable to refund to the passenger money which he has lost by theft against which it did not endeavor to protect him. Whether the train is running through a region infested with bands of marauders and carries no guard, or through towns nursing sneak-thieves, and carries porters too overworked to keep watch; there is a pecuniary risk upon the company, unless a jury on surveying all the circumstances will say that reasonable ordinary precautions to prevent stealing were taken. These jurors, by the way, are apt to be men who have carried money and watches on railroad trips themselves, and who are not specially likely to underrate the precautions which should be taken, which is one additional reason why the companies should be forewarned.

The Elevated Railroads of New York.

THE MECHANICAL DEPARTMENT.

Here, as on all roads, the locomotive is the central figure; practical men and poets alike look first at the feature which appears to have the most life and activity in it; and the department which includes this is always of interest. A full account of its workings would be well worth the reader's attention, but would extend beyond the scope of this article. As in other things already alluded to the methods are not so different from those of other roads except in their application; and that can be appreciated only by a close study. Faithfulness in any field has a value that often can be computed in black and white only by careful study of the final results; and on this road faithfulness is, par excellence, the vital point. The weight of the engines being limited by the strength of the structure they travel upon, faults must always be corrected by some way other than the enlargement of parts; and the reputation of the road depending upon the acme of promptness in handling the traffic, delays must be guarded against with the utmost vigilance. It follows, therefore, that the inspection of every detail of the rolling stock must be of the most thorough kind. Important parts being light, must be renewed before they show the least sign of weakness; oiling must be done with strict precision, a careful record being kept, in a book, of every car. Locomotive boilers are examined and washed every month, and a special examiner inspects the trucks of the engines at the same interval.

The success with which the inspection of engines is carried out is shown in the severe service performed, a dozen or more engines being kept running twenty-four hours each per day (with three crews) for a month at a time. The number of men in the shops is not so large as it will be, and the proportion of engines in service is larger than can be maintained permanently, for few or none of them have as yet reached the age where they require such important repairs as renewal of the fire-box. At present there are about 240 engines in service, with an average of only 15 in the shops. There are 900 cars.

The non-automatic Eames vacuum brake is used and gives very little trouble. At first thought the absence of automaticity would seem to be a serious defect in a brake used on trains carrying such an enormous number of passengers, but there are special circumstances in favor of the vacuum. The maximum speed is not high, so that the danger from a failure is not so great as in ordinary train running, and the guards, (which, by the way, seems a very appropriate title for men in this position, who do virtually no braking whatever), being obliged by their ordinary duties to be always very close to the brakes, are likely, in case of necessity, to get hold of them in the minimum time. The cars being light it is of course desirable to relieve them of shocks as much as possible, and the use of a plain non-automatic brake which can be easily graduated is found to practically eliminate shocks. The trains being short, the action of the brake is very quick, and it is applied to every wheel in the train at the same instant. This simultaneous action in practice is found to relieve the cars almost wholly of compressive strains, the buffers showing hardly any signs of ever having touched each other.

A non-automatic brake is less liable to cause delay by failures to release and by sudden and unexpected application by the hose blowing off. The slightest delay is of considerable importance on such a crowded line as the Manhattan, and these considerations are strongly in favor of a non-automatic brake of the simplest and most durable construction.

The locomotive runners, although paid for nine hours a day, work on an average only about 8¼, but the constant service exacted from the engines makes some inconvenience for the men, because it frequently happens that on the arrival of the hour at which a runner is off duty he will be 5 or 10 miles from home and must spend from 15 to 50 minutes in reaching his headquarters after he gets off the engine, while the man who relieves him has spent an equal time in getting to the appointed place of change. The men eat one meal while on duty (except those who have divided days—part morning and part afternoon—with a rest in the middle of the day—when traffic is lightest), but there is generally a rest of 10 to 20 minutes at a terminal, so that they do not have to eat while running.

The "extra" enginemen shown in the list are paid for all days on which they report for duty whether there be any work for them or not, though in the other departments applicants are plenty enough, so that the required force is maintained without paying wages except for actual trips performed. The continuous service of the engines as well as of cars is largely necessitated by the lack of terminal facilities. Trains finishing a trip must be immediately started on another, because there is no track room for another train if it were available; so that the vigilance required to keep cars and engines in the very best condition is required, not by lack of rolling stock, but lack of room to keep it in. A surplus stock of cars or engines to take the place of disabled ones (and thus render prompt repairs less imperative) would do more harm than good, for they would occupy valuable space.

The enginemen on the Elevated, as well as other employés learn by observation, as has been already noted, to an extent seldom seen elsewhere, and thus constantly advance their knowledge of their art, while the excellent system of discipline at the same time checks all extravagant notions or habits resulting from unbalanced judgment. The result has been to form a body of men whose qualifications are more uniform than generally is even hoped for. With most officers a code of rules seems like an impracticable ideal which a body of men can never be made to conform to; it is complained that individuals differ so greatly in their natural and acquired characteristics that with the very best of training they will always differ widely in their ways of doing things. And this is largely true; but success on the Elevated is not attained by employing men who have no judgment, and who thus have to work by rule or not at all; neither is the process such as to destroy or drive out individual talent; for training, pure and simple, never hinders growth, but simply directs it.

The Elevated officers have the well-known advantages always possessed by those who work on a large scale in any activity. The dry goods store, the machine shop, or the printing office that does the largest business is naturally the place to find the best methods and most economical and successful operation; and in training men, engine runners, or others, the same rule holds. Smaller roads cannot adopt all the desirable plans in use here, but they can imitate them, and learn much that is applicable in different circumstances, and that is the reason we advise them to investigate the methods used here.

The road foremen are occupied chiefly in the instruction of the men on the engines in economical methods of firing, and there being only two for the whole road, they have enough to do. Other duties which would in ordinary practice devolve on these officers are performed by the train dispatchers. With such a large number of trips so compactly arranged, and being under the necessity of always making each man's day figure out less than nine hours, while still making use of a minimum number of extra men, these dispatchers find a large portion of their duty to consist in assigning the men their runs and recording the particulars concerning each trip. The dispatcher is the important medium between the runners and the management, and he has constantly on hand some one of the thousand occurrences such as can never be attended to by mere routine. He has to formulate all complants both of and from the engineers and firemen, and has to decide as to the relative importance of many of them and whether or not they shall be settled on the spot or referred to a higher officer. The trips being so short and the men so easily get-at-able he can use his time to much better advantage than on an ordinary road. With men away from headquarters 6 to 36 hours each trip and most of them necessarily irregular it would be impossible to supervise them so efficiently. Superintendents and master mechanics who would emulate the Elevated can see, therefore, that they would quite likely need two, four, or six times as many officers of this kind as suffice here. For the reasons just named the road foreman would have more, and the engine dispatcher less, to do with the inspection of the actual practices of the runners than is the case here. Numerous things besides fuel economy demand the attention of the officer who is intimate with the men when they are out on the road.

June Accidents.

Our record of train accidents in June, given in this number, includes 43 collisions, 42 derailments and 3 other accidents; a total of 88 accidents, in which 16 persons were killed and 100 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	26	
Butting	12	
Crossing	5	
		— 43
DERAILMENTS:		
Broken rail	1	
Spreading of rails	1	
Defective switch	2	
Defective frog	1	
Broken wheel	3	
Broken axle	2	
Broken drawbar	1	
Failure to throw switch	1	
Misplaced switch	4	
Rail out for repairs	2	
Open draw	1	
Careless stopping	2	
Cattle	3	
Landslide	1	
Accidental obstruction	3	
Unexplained	14	
		— 42
OTHER ACCIDENTS		3
Total number of accidents		88

The causes of collisions where given were as follows:

Trains breaking in two	5
Misplaced switch	1
Failure to give or to observe signal	3
Miscellaneous	13
Unexplained	21
Total	43

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	5	..	5	6
Defects of equipment.	5	6	2	13	15
Negligence in operating	17	20	..	26	29
Unforeseen obstructions	..	7	1	8	9
Unexplained	21	14	..	35	41
Total	43	42	3	88	00

The number of trains involved is as follows :

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	15	17	..	32	25
Freight and other	67	25	3	95	75
Total	82	42	3	127	100

The casualties may be divided as follows :

KILLED:	Collisions.	Derailments.	Other.	Total.	P.c.
Employés	9	4	1	13	81
Passengers	2	..	..	2	12
Trespassers	..	1	..	1	7
Total	11	5	1	16	100
INJURED:					
Employés	14	19	4	37	37
Passengers	42	19	..	61	61
Trespassers	2	..	..	2	2
Total	58	38	4	100	100

Fifteen accidents caused the death of one or more persons and 23 caused injury, but not death, leaving 50 (56 per cent. of the whole) which were reported as harmless in this respect.

The comparison with June, 1886, shows:

	1887.	1886.
Rear collisions	26	13
Butting "	12	8
Crossing "	5	1
Derailments	42	51
Other accidents	3	2
Employés killed	13	18
Others "	3	20
Employés injured	37	63
Others "	63	23
Pass. trains involved	32	19
Average per day:		
Accidents	2.93	2.50
Killed	1.87	1.10
Injured	3.33	2.87
Average per accident :		
Killed	0.182	0.440
Injured	1.136	1.147

Two accidents were to empty passenger cars being switched, which, of course, are not properly passenger trains, and so have been classed as "other."

One of the crossing collisions was similar to one spoken of last month, a train breaking in two and placing the runner between two fires, so to speak. In the present instance the engineman seems to have at least made an effort to avert a collision.

As noted at the time the cause of the derailment at Pownal, Vt., June 7, and of that at Spuyten Duyvil, June 10, were not definitely discovered. The Vermont Commissioners, however, have fixed the blame of the Pownal accident on the operator, a boy of 17. Split switches, as every one knows, belong pre-eminently to that class of appliances which can be regarded as safe only when kept in *perfect* order. At Spuyten Duyvil the man in the tower may have carelessly turned the switch under the train, the interlocking machine there being an old one (put up in 1875) and the switches not provided with the Saxby & Farmer detector bar.

None of the accidents reported this month were attributed maliciousness, though last year *ten* derailments were numerated under that head. The half year to July 1 shows:

	1887.		1886.	
	Total.	Ave. per mo.	Total.	Ave. per mo.
Accidents	650	108	502	85
Killed	248	41	190	32
Injured	736	123	739	123

The Republic, White River and Forest Hill disasters, it will be seen, swell the average of killed per month 28 per cent., though the number of injured averages precisely the same for the six months in both years. The number given as injured in any accident is very generally an unreliable criterion, as we have heretofore remarked, because reporters have such various degrees of industry in collecting information and of judgment concerning seriousness of injuries.

British Railroads Fifty Years Ago.

The *Railway News* improves the occasion of the jubilee to give some interesting figures and reminiscences of the status of railroads in the United Kingdom 50 years ago, giving a list of the mileage and capital of all the railroads which had been constructed in whole or part at the time. The list commences with the Surrey Iron Railway, 9 miles long, with a capital of £60,000 in 1801. The Stockton & Darlington, 40 miles long, with a capital of £250,000 in 1821, is the 20th on the list and was preceded by 230¼ miles. When the Liverpool & Manchester was completed in 1826, with a capital of £1,465,000 for its 30¾ miles, it made 485¼ miles open, and was the 35th road, and in 1837 there were 53 roads, with a capital of £9,336,000 and 792¾ miles.

In 1886 there were 19,354 miles open, with a capital of £821,000,000. The capital per mile was £11,776 in 1837, against £42,368 in 1886. As there are 121,607.64 square miles in the United Kingdom, there was 1 mile of railroad to 153 square miles at the commencement of the Queen's reign, and 1 mile to about 6¼ square miles now. Twenty-three other roads, however, with an aggregate length of 1,116 miles, were then either under construction or had obtained acts of incorporation.

Only one road had in 1837 entered London, and in that year a committee of the House of Commons was appointed to investigate whether the railroads could be regarded as safe modes of conveyance for Her Majesty's mails. They reported, "that if the mails were sent by the railways, the post-office, with a view to their safe custody, should run its own engines and trains upon the railways, giving, as a matter of grace and favor, permission for a limited number of persons to travel in the trains, or in their own private carriages placed on the trucks (flat cars) of the railway companies.

At this time about 3,300 lbs. of mail per day was being carried between Liverpool, Manchester and Birmingham at a yearly cost of £3,000, which in the 50 years intervening has increased to £867,000 for over two thousand million pieces of mail matter.

In those days the third-class passengers were carried in open "wagons" with wooden seats, and second-class carriages were open at the sides, having no glazing. "The clear width of each compartment on some lines was only 8 ft. 7½ in. and the width 4 ft. 4½ in., each seat being 15 in. in width. Stout passengers had some difficulty in squeezing through the doors, which were only 18 in. wide."

On each ticket was written the date, the amount of the fare and the time of the train, all of which was entered on the retained stub; but the roads were not governed by the time specified, if we can trust the following announcement: "Passengers intending to join the trains at any of the stopping places are desired to be in good time, as the train will leave each station as soon as ready, without reference to the time stated in the tables, the main object being to perform the whole journey as expeditiously as possible.

"Passengers will be booked only conditionally upon there being room on the arrival of the trains, and they will have the preference of seats in the order in which they are booked. No persons are booked after the arrival of the train. No smoking is allowed in the station houses, or in any of the coaches, even with the consent of the passengers."

Mr. Earl, a railroad director, thought that the trains might travel at the rate of thirty miles an hour in the daytime and when all is clear, if the engines were sufficiently powerful. But it was held that it would not be safe for the post-office to have a night mail carrying passengers, in consequence of "the risk to the lives of the parties to be conveyed."

As above intimated, most of the roads of 1837 have been absorbed in larger companies, and some of them were mere tramways that are now disused. There are no reliable data showing the dividends paid in 1837, but a list of the bonds and shares of forty-four companies, of which thirty-two were in the course of construction, shows that only five had paid any dividends. The Grand Junction and Stockton & Darlington paid 10 per cent. The Liverpool & Manchester, 9. The Leicester & Swannington, 8. The Llanelly Railway & Dock, 7½, and the London and Greenwich 3 per cent.

Last year 697,213,000 passengers were carried on British roads besides those who traveled on nearly a million season tickets, and 257,289,000 tons of freight were carried. The gross receipts were £69,556,000, working expenses £36,788,000, net receipts £32,768,000, making an average dividend of 4.13 per cent possible on the entire capital.

It will be noticed that the working expenses are only about 53 per cent. of the gross receipts. The passenger rates are about equal to ours and the freight rates nearly three times our rates. No returns are made in England showing the passenger mileage and the exact average sum per passenger mile, as the charges per ton mile is a matter of estimation. Jeans, page 243 of "Railway Problems," says: "If a first-class fare is assumed at 2d. per mile, and the average third-class fare is 1d.;" this assumption is generally received as correct, with the second-class fare at 1½d. Applying it to the official returns of passengers carried last year, we have

32,465,000 1st class passengers	@	4c	$1,298,600
60,986,000 2d "	"	@ 3c	1,829,580
603,762,000 3d "	"	@ 2c	12,075,240
697,213,000 give total receipts for one mile			$15,203,420

The average receipt per mile would be 2.2 cents. This result is modified by the 924,000 season tickets sold. The average price per mile on all the railroads of this country in 1885 according to Poor's Manual was 2.2 cents.

There is the same uncertainty about freight rates. Jeans seems inclined to assume 1½d. per ton mile as correct. The average rate in this country for 1885 was 1.16 cents per ton mile; and Mr. Jeans says: "If the assumed English average were now charged on the American railroads the income of the latter, on the freight carried in 1884, would have been 200 millions sterling more than it really was." It may be questioned, however, if in the presence of an additional income of $1,000,000,000 our railroads would be operated with the same economy as at present.

As a matter of comparison the Quincy road, built to carry granite from the quarry to the shipping dock, was completed in 1826. The Baltimore & Ohio, the first road designed for both passengers and freight, was commenced July 4, 1828, and the South Carolina was completed in 1833. Horatio Allen, who is still living, being its chief engineer. Its 135 miles is said to have made it the longest continuous road under one management and name in the world at that time.

In 1837 we had 1,497 miles of road, or nearly twice as much as England, but in 1830 our total settled area; that is, having two inhabitants to the square mile, was 632,717 square miles and in 1840 807,292, if the rate of settlement was uniform our settled area must have been 754,000 square miles, or fully 500 square miles of settled territory per mile of railroad. In 1880 there was one mile of road to 17 square miles of settled country; at the end of 1886 there probably was one mile to about 13 square miles settled; but for the whole United States, not including Alaska, there are nearly 22 square miles per mile of railroad.

Carrying our retrospect back for the fifty years ending a century ago, we find that in 1735 Abraham Darby made the first successful use of coke in making pig iron at Coalbrook Dale, Strophshire. Up to this time iron had been made with charcoal only, and the rate at which the deforesting of England was proceeding excited universal alarm. 1759. Patent granted for rolls for rolling iron bars. John Smeaton built the first engine using a cylinder for giving blast to furnaces in 1760, which was erected at the Carron Iron Works, and in 1769 James Watts applied a steam engine to the contrivance. In 1784 Henry Cort obtained a patent for converting pig iron into malleable iron in the puddling furnace.

These include about all the improvements the application of which have made iron an article of necessity and common use, and they were all made within fifty years; without them both railroads and steamships would have been impossible.

Iron and Steel Production for First Half of 1887.

Mr. James M. Swank, Secretary of the American Iron and Steel Association, returns our total production for the first six months of the last five half years as follows, in gross tons:

First half of 1885	1,920,371
Second half of 1885	2,124,155
First half of 1886	2,637,687
Second half of 1886	3,045,624
First half of 1887	3,051,699

This is much less than the expected increase and is accounted for by the Connellsville coke strike which commenced June 7. As a consequence, at the end of June 48 furnaces were banked for want of Connellsville coke; 1,290,238 tons of this output, or about 42 per cent., were Bessemer pig, about 40,000 tons of which were produced in Maryland, West Virginia and Tennessee. The Michigan and Cranberry iron of North Carolina not having been sold for converting into Bessemer steel, is not classed as Bessemer iron by Mr. Swank. The production of Bessemer ingots for the first half of this year was 1,372,743 gross tons, which includes 27,709 tons of Clapp-Griffiths steel.

The production of Bessemer steel rails for the first half of the year was 1,030,530 gross tons against a total production of 1,574,621 tons in 1886. Mr. Swank thinks the possible production for the year may be 2,100,000 gross tons, which can not be materially exceeded.

The production of open hearth steel ingots was 155,714 gross tons, against a total production for last year of 218,950 tons; 11,068 tons of this year's make of open hearth steel was rolled into rails.

Mr. Swank's adhesion to the net ton of 2,000 pounds, a ton which is used by no other people, and by which iron is never sold, except in the retail way, is not so logical as the action of the metric measure advocates.

It is said that through the agency of the Pittsburgh, Fort Wayne & Chicago the city of Chicago is to have four new viaducts over that road, located at Archer avenue, Twenty-sixth, Thirty-first, Thirty-fifth and Thirty-seventh streets, and foot viaducts at all the other cross streets south of Twenty-second, and without a dollar of cost to the taxpayers. This means an outlay of $1,500,000 to the railroad company, but in the course of time it will be fully compensated for by the advantages gained. Heretofore the company has been compelled to reduce speed within the city limits, its yards have been cramped, freight has been delayed and passenger traffic impeded in consequence, to say nothing of the numerous suits for damages growing out of accidents of various sorts at street intersections. The company acquires a narrow strip of land alongside its right-of-way on which it may construct additional tracks for the accommodation of its vast traffic. The right to run passenger trains at the rate of 20 miles an hour is also conceded. With this enlargement of the Pennsylvania Company's city trackage, that corporation will be enabled to perfect terminal facilities for the Pan Handle, which have not been first-class hitherto, and by utilizing the old track of the Pan Handle in connection with the recently acquired South Chicago & Southern, the Pennsylvania will have a complete belt line. The old line of the road crosses the St. Paul, Northwestern, Wisconsin Central, Burlington, Santa Fe (old Chicago, Pekin & South Western), Chicago & Alton, Wabash, Rock Island, Chicago & Eastern Illinois, Western Indiana and Illinois Central just outside the city limits. The new South Chicago & Southern crosses the Nickel Plate, Chicago & Atlantic, Louisville, New Albany & Chicago, and Michigan Central at Hammond and the Lake Shore and Baltimore & Ohio near South Chicago. The work of extending the new road to Globe Station, Ind., a point 25 miles from Union Depot, is going rapidly forward. When this is entirely completed, it is said on the best of authority that the bulk of the Pan Handle's freight traffic destined to Chicago will go via the South Chicago & Southern to South Chicago, thence over the Fort Wayne tracks into the city. This will avoid many stops for crossings and save 7 miles in distance. Some of the through passenger trains will probably go this way also, as by doing so they can arrive at the same depot in Chicago with a saving of at least 45 minutes. Passenger trains are now being run regularly by the Fort Wayne to Hegewisch, the site of the U. S. Rolling Stock Co.'s shops, on the line of the South Chicago & Southern. Besides enabling the Pan Handle to tap South Chicago, this new line goes through the Wolf Lake district of the Calumet region, where an Eastern syndicate is about to open up the now deserted harbor of Wolf River and build the town of East Chicago. The country through which the new road passes is excellently adapted for development into first-class dock property.

As long ago as May 25 we called attention to the probable scarcity of vessels for ore shipments. And now Hussey, Hoyt & Co.'s bulletin says that after two months of navigation the ore shipments from the different lake ports show only a small increase over the shipments of last year, and as the season advances it becomes evident that the vessels on the great lakes cannot transport much more than 3,500,000 tons, while the mines are well able to produce 5,000,000, or even more tons.

The railroads at present are charging twenty cents to Ashland, and the lake freight is $2.50, making a total of $3.20. The Milwaukee, Lake Shore & Western has promised, it is stated, to haul ore to Chicago next winter for $2.25 per ton. Under these circumstances some of the new mines are not making any attempt to ship ore this season, but are stocking it with the expectation of shipping over the Chicago & Northwestern and the Lake Shore roads, which expect to be in shape to distribute several hundred thousand tons of ore to

coke and charcoal furnaces in Wisconsin, Illinois and Michigan next winter.

There is a fair prospect of lake vessels paying well not only through this season, but through the next, unless there is a great reduction in our make of pig iron. All of the ship building yards are understood to be full of orders for some time, and unless new yards are started or the present ones enlarged it is doubted if the Lake Superior Consolidated Iron Company can get their fleet of ten new steamers in time to do much transportation next season.

W. A. Ashe, of the Quebec Observatory, has written a letter to *Science* on the Hudson Bay route, in which he says the Canadian government concluded that before encouraging the line by a subsidy they would establish observing stations on the shores of the bay, which have shown that in the years 1884-86, on account of ice, navigation for the ordinary steamer was limited to three months, and for a strengthened steamer the limit was four, or, at the utmost, five months.

The special objections, aside from the ice question, are the difficulty of the passage itself. An unknown and unlighted coast line, with few harbors of refuge, extreme depth of water, one hundred fathoms, being found right up to the shore, with generally very foul holding ground when the depths are more moderate. As there was rain or snow, with its attendant thick weather, on an average a little oftener than every other day, and the great depths preventing soundings being of value, navigation must always be dangerous. In addition, the proximity of the strait to the magnetic pole so diminishes the directive force of the magnetic needle that the common compass is perfectly useless, and even with the Thomson compass disturbing elements on ship board have their values so increased that sources of error are to be feared, the effects of which cannot be counted on during thick weather.

Mr. Ashe concludes that though in view of the developments of science it is not safe to say that the navigation of Hudson Strait will not be possible for five or six months when necessity arises, we need not consider its navigation as an immediate probability.

From the July report of the Department of Agriculture, it appears that there has been a further increase in the acreage planted to corn, making the area now about 78,000,000 acres. It is said that there has been an increase in the relative proportion of this crop in Kansas, Iowa, Nebraska and Minnesota, and even in Dakota the percentage of increase in area is about as large in corn as in wheat. The tendency is looked on as a good one, inasmuch as the competition of foreign wheat growers is increasing, and the prices of this staple are more subject to speculative influences than those of corn. The season has been fairly favorable. The average condition of the crop is 97.7, which differs little from the July condition for the last three years. The average condition in the seven great corn-growing states is nearly 99.

The condition of the wheat crop, however, is not so favorable. Drought and the chinch-bug have brought the general average for spring wheat down from 87.3 last month to 79.3 for July, four points lower than in July last year. Rye, barley and oats also have suffered from drought and insects.

The status of the cotton crop has not declined since the June report. The average is 97, which is four points higher than the July average for the last 10 years; and the crop under unusually clean cultivation. The daily reports of later date than this report from the Department have been very conflicting. While the weather has been generally favorable for the wheat harvest it has not been so favorable for growing corn.

Most trade journals have noticed that the usual dull time of summer has been characterized this year by either no falling off in production or by an increased production. This general judgment is confirmed by a table published in the Boston *Post*, showing the bank clearances in 35 cities for the first half of 1886 and in 36 cities for the same period in 1887. They were:

	First half 1886.	First half 1887.	Increase. Per cent.
In New York	$16,091,578,589	$17,102,518,889	6 6
Outside of New York	7,307,166,059	8,918,831,767	22.1
Total	$23,398,744,648	$26,081,350,656	11.5

The additional city is Wichita, Kansas, which has $31,200,000, and was not reported last year. Kansas City, St. Paul, St. Joseph, Denver and Omaha show a gain of over 50 per cent. each, Omaha leading with a gain of 84.6 per cent. But two towns show a decrease, Norfolk, 1.8, and Galveston, 19.0 per cent.

The heavy rains of last week and the first days of this week have caused very serious damage to railroads as well as highroads in New England, New York and Pennsylvania. Many washouts are reported, and extraordinary destruction of bridges and culverts, with, of course, serious interruption of travel. It is an ill wind that blows nobody good, however, and bridge builders will be the gainers, although no large bridges, and very few railroad bridges, are reported destroyed. The damage to bridges seems to have been almost entirely confined to highways, and naturally to the small streams, which get up quickly.

An important railroad scheme in Chicago is that known and incorporated last week as "The Metropolitan Railroad Company," and having as its object the construction of an underground system modeled largely after the London Metropolitan. Outside the city limits, reaching and surrounding every suburb and forming a complete belt line are proposed surface roads. The company has been organized, and the incorporators, including half a dozen lawyers and real estate men of some local reputation, are free in saying that it will be some years before the project will be perfected.

On another page will be found a description of one of the principal Cuban railroads which may be taken as a characteristic line. The account is so thorough that it will give the reader a pretty comprehensive knowledge of railroad building, equipment and operation in that island. Aside from its interest to those who are students of comparative railroading, it will have a certain value to contractors and dealers.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Atchison, Topeka & Santa Fe, 7 miles west of Carrollton, Mo.

St. Paul, Minneapolis & Manitoba, 262 miles west of Minot, Dak., 52 miles since last reported.

This is a total of 59 miles for the week, making 2,548 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.
1887.....2,548	1883.....2,761	1879.....1,187	1875..... 594
1886.....1,955	1882.....5,473	1878..... 941	1874..... 913
1885.....1,272	1881.....2,924	1877..... 830	1873.....1,966
1884.....1,712	1880.....2,525	1876.....1,046	1872.....3,372

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Poor's Directory of Railway Officials. The second edition of this useful publication is received. The form of the book has been changed to an octavo, about the same size as the Manual, which is an improvement for most users. Some changes have also been made in the classification. In addition to the general list of officials of all railroad companies there are special lists of General Managers and Superintendents, of General Freight and Passenger Agents, of Master Mechanics, Car-Builders and Car Painters, Purchasing Agents and Chief Engineers—a change which will undoubtedly be convenient to users of the volume. A city and town index is also added, giving alphabetically the names of towns in which the different railroad companies are domiciled or where shops for repairs are established. These changes in the form of the book and in the classification and the additional lists will make it much more convenient and useful than before, and it remains even the best publication of this sort which has yet been attempted. Price, $2. Publishers, H. V. & H. W. Poor, 70 Wall street, N. Y.

TECHNICAL.

Locomotive Building.

The Rhode Island Locomotive Works have received an order from the Consolidated Brooklyn Elevated Railroad Companies for 45 locomotives.

The Car Shops.

The Brownell & Wight Car Co., St. Louis, Mo., are erecting extensive new buildings on the southwest corner of Monroe and Second streets, directly opposite their office and erecting shops. These will contain the mill, whose capacity will be doubled by its transfer to the new structure, and by purchase of additional machinery and one or two other departments.

The Jones Car Co., of West Troy, N. Y., have shipped several cars to the Merrimac Valley Railroad Co., of Lawrence & Methuen, Mass.

Manufacturing and Business.

The Lewiston Locomotive Driving Wheel Co. has been organized for the manufacture and sale of appliances connected with locomotives. The officers are: President, George P. Westcott; Treasurer, James H. Smith; Directors, James H. Smith, J. S. Riker, George Burnham, Jr.

Nathan Stedman, manufacturer of steam engines at Aurora, Ind., has commenced the manufacture of the Lynn engine, for the Lynn Engine Co. of Dayton, Ohio. The engine is intended for electric purposes. Mr. Stedman is experimenting on a machine for pulverizing mud for bricks.

Messrs. Alfred Box & Co., of Green street, Philadelphia, have just completed a 72-in. reach radial drill to be shipped to a large boiler works in Boston. The firm has added to its capacity in response to the demands of trade.

Among the recent shipments of the Lappin Brake Shoe Co. from its new works at Bloomfield, N. J., was one order for 3,100 shoes for the Manhattan Elevated Railroad Co. of New York. This company has been giving the shoe an exhaustive test for two years.

The American Railway Equipment Co., of Atlanta, Ga., has been incorporated to buy, sell and manufacture railway cars, etc. The capital stock is $1,000,000 and the incorporators are: John A. Fitten, Reuben Jones, T. M. Clarke, R. C. Clark, Louis Ghostin, A. H. Cox and others, of Atlanta, Ga.

A machine shop is to be built at Belfast, Me., by Isaac Varney.

Among the recent shipments of the Salem, Mass., Foundry & Machine shop, are two elevators to the Lonsdale Mills, Lonsdale, R. I.; two to the China Mfg. Co., Suncook, N. H.; and one each to the Cocheco Print Works, Dover, N. H., and the Newburyport Electric Light Co. They have just sent a large order of lap trucks to the Whitefield Mills, Newburyport.

Bridge Notes.

The contract for the iron work on the new Union street bridge in Lawrence, Mass., has been awarded to the Boston Bridge Company, the cost to be $39,790, and the work to be completed by February.

Bids will be received until Aug. 1 for an iron bridge over Harnmess Creek, Pa. Address County Commissioners, Lancaster, Pa.

Sealed proposals for building masonry piers for Harvard Bridge, over Charles River, between Boston and Cambridge, in accordance with form of contract and specifications to be furnished by the city engineer of the city of Boston, will be received by the Commissioners of Harvard Bridge at the Mayor's office, City Hall, Boston, until Aug. 15, 1887. Each proposal must be accompanied by a properly certified check for the sum of $1,000 payable to the order of the Commissioners of Harvard Bridge; said check to be forfeited to said Commissioners in case the bidder does not accept the award of the work to him. The work will include from 20 to 23 ashlar masonry piers with pile foundations.

The California Bridge Co. will have works built at North Oakland, Cal., for the manufacture of steel and iron bridges. The Judson Iron Works are the constructors.

The San Francisco Bridge Co. has been awarded the contract to build a bridge at Ukiah, Cal. Cost, $9,000.

The King Iron Bridge Co., of Cleveland, O., has been awarded the contract to build a single span iron bridge at Huntington, Mass.

Thos. Mercer, Samuel Whitson and G. W. Beerbower, of West Chester, have been awarded the contract to build an iron bridge in Chester County, Pa.

The St. Louis Bridge & Iron Works were awarded contracts last week for 7 public highway bridges varying from 50 to 70 ft. in length, and with a capacity of 2,000 lbs. per lineal foot with the factor of safety 4—all for St. Louis County. The price was about $20 per foot, and the time of completion 60 days.

Five piers of the Sault Ste. Marie bridge are completed, and it is expected that the rest will be done very soon. The erecting of the superstructure was at last accounts to have begun this week.

Iron and Steel.

The Hoene Consolidated Coal & Iron Co., which is to take the B. H. F. Hoene coal mines near Warrior, Ala., and work them on a larger scale, has been incorporated. The incorporators are all Hoenes except Mr. Ignatus Pollak, of Montgomery. The declaration provides for the manufacture of coke, iron and steel as well as mining coal, the capital stock being put down at $250,000.

Bowen & Signor, proprietors of the Saranac Iron Co., Saranac, N. Y., have made an assignment. The liabilities are estimated from $250,000 to $300,000, and the assets at about $75,000.

The Mullins Silicated Iron & Steel Co., of East St. Louis, Ill., filed articles of incorporation with the Secretary of State at Springfield, July 18. Capital stock, 3,000,000; object of company, the purification and improvement of iron and steel. The incorporators are: Abram D. Williams, Henry C. Sparr and John Lamb.

The Clark Malleable Iron & Steel Works, recently organized at Louisville, Ky., has increased its capital stock to $500,000.

Hammond & Sons' Iron Works, Pittsburgh, were burned, except the puddling department, last week. The loss is estimated at $150,000; insurance, $75,000. Two hundred men are thrown out of employment.

The management of the Reading Iron Works, at Reading, Pa., state that their mills are now closed for an indefinite period, as they will not run them at a loss. Should prices warrant, work will be resumed at the old wages. If not, and the men refuse to accept a reduction, the works will remain idle.

The Andover, N. J., Iron Co.'s furnaces are out of blast, and a pecuniary loss of $60,000 is entailed.

The Rail Market.

Steel Rails.—The market remains unchanged, with prices the same as last week. Of the 28,000 tons mentioned last week, 10,000 tons are supplied by an American concern, the remainder of the order going to England. The Lackawanna Iron & Coal Co. reports sales amounting to 29,000 tons during the week, 10,000 to California and the remainder to the West and South. Quotations: $38.50@$39 for early delivery, $38@$38.50 for fall, and $37.50@$38 for late fall and winter work.

Old Rails.—Quotations: $23.50@$24 for tees, and $24@$24.50 for double heads.

Scrap.—There is only a slight demand, and but few sales are being made. Holders are asking $21@$22 for yard scrap, and a selected lot of yard scrap has been sold at $22.75.

Rail Fastenings.—Spikes are quoted 2.50c. net; angle fish bars, 2.1@2.25c; steel angle bars, market weak, $2.20@$2.30; bolts and nuts, 3@3.2c., and bolts and hexagon nuts, 3.2@3.3c.

Petroleum.

The system of transporting petroleum in tank steamers and storing it in large iron reservoirs is rapidly coming into use throughout Germany. Herr Riedemann, a leading petroleum importer, has just ordered six large petroleum reservoirs to be erected at Gerstemünde, near Bremerhafen, which, together with the nine existing tanks, will enable him to store 750,000 barrels of oil. This gentleman also owns a fleet of tank steamers, which is shortly to be increased by a new vessel of 3,750 tons capacity. Count Larisch Mönnich is now erecting in Oderburg, close to the Russian frontier, a refinery for petroleum, which is expected to be in working order within two months. The plant has been arranged for an output of 10,000 tons of refined oil per annum.

Oil Fuel.

Lima oil more nearly resembles Caucasian petroleum than any oil discovered in this country. This circumstance and the fact that Baku oil is used as fuel on all the Russian railroads in the region between the Black and Caspian seas, and is the only fuel employed in steamers on those seas and on many on the Mediterranean, and in hundreds of workshops, and has displaced coal on Swedish railroads, has caused such tests to be instituted as would determine the value of Lima oil for fuel purposes. The results have been such as to cause some of the largest Cleveland iron-making firms to introduce oil permanently as fuel, partly for steaming and partly for heating purposes. When the principle of feeding oil into a furnace is better understood, and when proper economy in the use of liquid fuel shall be practiced, the benefit of oil fuel will be too great to permit manufacturers to use coal as fuel. —*Iron Trade Review.*

Cinders in Ballast.

The quantity of cinder showered upon the track is so great as to necessitate the overhauling of the ballast every year. Anybody can satisfy himself on this point by noting the appearance of the road between this city and Philadelphia before it is overhauled in the fall, when the road is inspected. The enviable reputation of the Pennsylvania Railroad is maintained by the careful removal of the cinder from the ballast. The cinder from the smoke stacks fills the interstices in the ballast, lies on top of the broken stone, and is ground into dust that is annoying to the traveler. To keep the road-bed in good order, it is necessary to lift the upper portion, sometimes all, of the ballast, and remove the cinder accumulated. Iron kettles holding from eighty to one hundred gallons have been placed along the track on portions of the western division, for the purpose of collecting the cinder for easy removal. Workmen gather the cinder into the kettles, which, when filled, are lifted on a flat and hauled away.—*Iron Trade Review.*

The Tehuantepec Ship Railway.

The directors of the Eads Concession Co., which has controlled all steps thus far taken in the Tehuantepec Ship Railway scheme, held a meeting in Pittsburgh, Pa., on July 27. It was the first meeting since the death of Captain James B. Eads. Among those present were ex-Secretary of the Treasury William Windom, William Shaw, Second Vice-

President of the Pennsylvania Railroad Co.; Charles J. Clark, one of the most prominent of Pittsburgh capitalists, and Colonel James Andrews, who was Captain Eads' partner in the work of constructing the St. Louis bridge and the jetties. It was decided to begin active efforts looking to the opening of work on the ship railroad at an early date and also to conduct operations upon a plan entirely different from that mapped out by Captain Eads.

Instead of making new application to Congress for a charter a ship railroad company will be incorporated under the laws of one of the states. A committee was appointed to examine the laws of the various states and determine where the application for a charter shall be made. After the charter has been obtained the property of the Eads Concession Co. will be turned over to the ship railroad company and the stock and bonds of the latter placed on the market.

Star Machine Company's Portable Forge.

The Bureau of Steam Engineering of the U. S. Navy Department has made the following reply to an order of Commodore Gherardi, commanding the New York Navy Yard: SIR.—In obedience to your order of the 9th of June (a copy hereunto attached) to make a thorough and careful test of the "Star Machine Co.'s Improved Portable Forge," the Board met on June 28, and proceeded to carry out said order.

Forge No. 8, as per circular appended, was the one chosen for trial, it being best suited for purposes under the cognizance of the Bureau of Steam Engineering, for use on board of vessels.

After a fire had been well underway, two pieces of iron, 2 in. in diameter, were brought to a welding heat in five minutes and a clean smooth weld made.

The blast is excellent and continuous; the frame of the forge well braced, and set screws are so arranged as to take up the lost motion of the shaft and other parts.

In conclusion, we beg to state, that it is the best portable forge that has come under our notice, and we therefore recommend it for use in the naval service.

Very respectfully,
JOHN L. D. BOTHWICK, Chief Engineer, U. S. N
J. J. BARRY, Passed Asst. Engr., U. S. N
F. C. BOWERS, Asst. Engineer, U. S. N.

SCRAPS.

Washouts and Cloudbursts.

The past week has been remarkable for its wetness. Here and there railroads have been submerged and travel suspended. The Fitchburg has been especially afflicted in this regard. There were 25 washouts and 11 landslides reported on a stretch of road between Miller's Falls and Erving, Mass., a distance of 6 miles. There is a high tide reported all over the lot which would seem to have transformed most arid localities into full-fledged watering places.

Money, Not Words.

Of course grammar is one thing and railroad management another, but there is no obvious reason why they should not consist, the one with the other. Yet we are informed by the holder of one of those valuable pieces of paper that the word "aggrigate" appears upon the certificate of the preferred stock of the great Chicago & Northwestern Railroad. We can find "irrigate" in Webster's Dictionary, and it has a certain bearing on railroad affairs, but "aggrigate" has been searched for in vain. It isn't there; it is a select term, and is used only in the limited circles where this particular article of luxury abounds.—*Hartford Courant.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, 2 per cent., quarterly, payable Sept. 1, to stockolders of record Aug. 15.

St. Louis & San Francisco, 3½ per cent., semi-annual, payable Aug. 10, to stockholders of record July 22.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *National Association of General Passenger Agents*, at St. Paul, Minn., Sept. 20.

The *Master Car and Locomotive Painters' Association* New York, Sept. 14.

Railway Station Agents' Convention.

It was decided at a session of the Station Agents' Convention, held in Minneapolis last week, to change the name of the Association to The Grand Division of Railway Station Agents' Association. The Secretary's report shows the organization is much stronger than a year ago. It recommended the purchase of the *Journal*, a paper devoted to the interests of the Association. The membership now numbers 900. L. A. Clark, Agent of the Burlington & Mo. Railroad in Columbus, Neb., has been elected President for the ensuing year.

Southern Rate Committee to Meet.

The Southern rate committee, composed of some 25 or 30 general passenger agents of the trunk lines of the country, will convene at Hotel Monte Sano, Huntsville, Ala., on the 10th of August and will remain in session two or three days.

The Institution of Civil Engineers.

The Institution of Civil Engineers has been decided by Lord Coleridge not to be an educational institution, on the ground that instruction in a particular art or profession, intended to promote a means of livelihood, cannot be considered as education.

This decision is of great interest to the Institution and to all kindred societies, as its renders them liable to the payment of corporation taxes.

The resources of the Institute at the annual meeting in 1886 were, besides its premises in Great George street and the contents, which are insured for £32,000: Stocks of the par value of £66,000, and trust funds left for medals, etc., £16,000.

Roadmasters' Association of America.

The following notice is issued by the Secretary of this association:

All members who have not already communicated with the present Secretary are requested to furnish him with their present address for correction in the books of the association.

H. W. REED, Secretary *pro tem.*, Waycross, Ga.

State Canal Convention.

The convention of those interested in further improvement and enlargement of the canals of the state of New York opened at Rochester yesterday. It was thought that the attendance would be unusually great. The preliminary caucussing indicated a considerable feeling in favor of asking the state to appropriate $1,000,000 next year.

PERSONAL.

—Frank G. Ward has resigned the General Superintendency of the Panama Railroad.

—Col. L. P. Grant has retired from the Presidency of the Atlanta & West Point Railroad Co.

—C. C. Wheeler has resigned the position of General Superintendent of the Chicago & Northwestern.

—C. M. Wicker, who since the organization of the Chicago Freight Bureau has been its chairman, has tendered his resignation.

—W. H. Pettibone has resigned the position of General Superintendent of the Toledo, St. Louis & Kansas City Railroad.

—Almon Drake, for 30 years a locomotive engineer on the Boston & Albany road, and also Master Mechanic of the Vermont Valley for several years, died last week, aged 66 years.

—Through the courtesy of John L. Mitchell of Milwaukee, President Cleveland, wife and party have had the Alexander Mitchell mansion on Grand avenue placed at their disposal during their proposed visit in that city.

—Mr. A. G. Kleinbeck, of Chicago, Superintendent of Construction on the St. Louis & Chicago, was married to Miss Tillie Lange, of Litchfield, Ill., last week. The bride's father, at whose home the event was celebrated, is Master Car-Builder of the Wabash.

—Dr. E. D. Standiford, ex-President of the Louisville & Nashville road, Vice-President of the Jeffersonville, Madison & Indianapolis Bridge Co., a director of the Farmers and Drovers' Bank of Louisville, Ky., and one of the wealthiest men in Kentucky, died on July 26. He was married only three weeks ago to Miss Lorena Scots, of Paducah. He was 56 years old.

—John M. Whitman, who has been appointed General Manager of the Chicago & Northwestern, has been for several years General Superintendent of the Council Bluffs and Iowa lines of the company, and previous to the purchase of the Chicago & Pacific by the Chicago, Milwaukee & St. Paul was Receiver and General Manager of that road. He will have charge of all the operating and construction of the Chicago & Northwestern system.

—Frederick J. Calhoun died at his residence, Boston Highlands, Mass., on July 21, aged 67 years. He started in the railroad business early in life. His first important service was on the Shore Line Railway as Freight Agent. He then became Mail Agent, and was afterwards Superintendent for seven years. He was also Superintendent of the Providence & Worcester and of the Chesapeake & Ohio. His last active service was as Purchasing Agent of the Atlanta & Richmond road.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point.—C. H. Phinizy has succeeded Col. L. P. Grant as President of this company.

Big Valley & Clinton.—The incorporators of this new Tennessee company are J. S. Ross, D. K. Young, C. J. Sawyer, D. R. Coward and Henry Clear, Jr., of Clinton; R. S. Payne and J. M. Thornburg, of Knoxville, and J. O. Lumsden, of Michigan.

Central, of Georgia.—Marshall H. Connolly has been appointed Private Secretary to President Alexander.

Chattanooga Southern.—The company, previously reported, has organized with William Crutchfield as President; Robert Dougherty, Vice-President, and John G. Wood, Secretary and Treasurer.

Chicago, Kansas & Arkansas.—Joseph Broaddus, late of the Chicago, Milwaukee & St. Paul, has been appointed Chief Engineer of this road.

Chicago, Milwaukee & St. Paul.—L. W. Campbell has been appointed agent at Chicago, vice T. E. Wilson, resigned.

Chicago & Northwestern.—John M. Whitman has been appointed General Manager, to take effect Sept. 1, H. G. Burt, Superintendent of the Iowa Division, will assume the duties of Chief Engineer, headquarters at Chicago.

Sherburn Sanborn has been appointed General Superintendent to succeed C. C. Wheeler.

M. Hopkins has been appointed Superintendent of the Iowa Division, with headquarters at Boone, Ia., vice H. G. Burt, transferred. George F. Bidwell has been appointed Superintendent of Northern Iowa Division, headquarters at Eagle Grove, Ia., vice M. Hopkins, transferred.

Dr. W. F. Stennett, Assistant to the General Manager, has been appointed Auditor of Expenditures, a newly-created office.

Cleveland, Columbus & St. Louis.—W. F. Snyder has been appointed General Western Agent, office at St. Louis, vice W. F. Synder, resigned.

Duluth, South Shore & Atlantic.—The following directors were elected last week: Joseph McMillan and Hugh McMillan, Detroit; Samuel Thomas, Calvin S. Brice, New York; C. R. Cummings, Chicago; A. D. Juillard and George I. Seney, New York.

Fort Scott, Wichita & Western.—General Manager Clark announces the following appointments on this road, which is the successor of the St. Louis, Fort Scott & Wichita: A. W. Dickinson, General Superintendent, office, St. Louis; Russell Harding, Superintendent, office, Wichita, Kan.; W. H. Newman, General Traffic Manager, office, St. Louis; Oscar G. Murray, Freight Traffic Manager, office, St. Louis; H. C. Townsend, General Passenger and Ticket Agent, office, St. Louis; Thomas F. Fisher, Assistant General Freight and Passenger Agent, office, Wichita, Kan.; C. G. Warner, General Auditor, office, St. Louis; H. C. Hadley, Local Auditor, office, Wichita, Kan.; D. S. H. Smith, Local Treasurer, office, St. Louis; M. W. Levy, Assistant Treasurer, office, Wichita, Kan.; J. H. Richards, General Attorney, office, Wichita, Kan.

Illinois Central.—It is stated that changes in the management will go into effect Aug. 1. The office of General Traffic Manager, which was abolished when Joseph F. Tucker left the service of the company, will be revived. T. J. Hudson, at present Superintendent of the Illinois and Iowa lines, will be appointed General Traffic Manager of the entire system, with headquarters at Chicago.

M. C. Markham, at present assistant to the General Manager, will be promoted to the position of Assistant Traffic Manager, with headquarters at Chicago. The office of Superintendent of Lines in Illinois and Iowa has been discontinued and the duties divided. A. A. Sullivan, Division Superintendent of the Chicago Division, will succeed Mr. Hudson as Superintendent of Lines in Illinois. Mr. M. Gilleas, Superintendent of the Iowa Division, will become Superintendent of the Iowa lines. Mr. Sullivan will be succeeded as Division Superintendent of the Chicago Division by J. C. Ross, now Secretary to General Superintendent Beck. The office of Superintendent of Car Service has been created, and E. M. Horton has been appointed to the position.

Lake Superior & Southwestern.—The directors and officers of this new Minnesota company are: President, Andrew Knox, of Austin; Vice-President, Dr. Mayo, of Rochester; Secretary, C. D. Belden, of Austin; Treasurer, E. Damon, of Rochester. Directors: S. M. Smith and D. W. Hurn, of Clear Lake; L. S. Butler and B. H. Beckett, of Northwood; B. B. Hurbert and James Bixby, of Red Wing; B. F. Bacon, of Brownsdale.

Metropolitan.—The incorporators of this Chicago company are: Eli H. Doud, John Miller, John Gray, Henry W. Leman, John S. Miller and Benjamin F. Chase, all of Chicago.

Monongahela East Shore.—Charles Donnelly is President of this new Pittsburgh, Pa., company.

New Haven & Derby.—At a special directors' meeting held this week. Charles Attwater, H. P. Frost & John P. Tuttle resigned from the Directory, and Wm. H. Stevenson, Wm. H. Starbuck and Mr. Bostwick were elected to fill the vacancies, the new directors representing the New York & New England. Another meeting will be held on Aug. 5, and the new President and Vice-President will then be chosen.

New York, Lake Erie & Western.—Louis B. Fiske has been appointed Train Dispatcher of the Rochester Division.

Panama.—J. E. Reeves has been appointed General Superintendent, vice Frank G. Ward, resigned. J. E. Beck has been appointed General Roadmaster, vice John W. Fry. Thomas O'Connell, Trainmaster, has resigned, and J. H. Kelly appointed in his place. James Butler has been appointed General Freight Agent at Colon, vice J. Abello.

Pittsburgh, Youngstown & Ashtabula.—The directors of this new consolidated company are: Henry L. Morrison, Amos C. Fisk, of Ashtabula: Caleb B. Wick, W. Scott Bonnell, J. G. Butler, Jr., of Youngstown; William Thau, J. N. McCullough, William Mullins, Thomas D. Mesler, of Pittsburgh; George B. Roberts, John N. Hutchinson, of Philadelphia; The officers are: President, John N. Hutchinson, of Philadelphia; Treasurer, John E. Davidson, of Pittsburgh; Secretary, Frank Semple, of Pittsburgh.

Polk County Real Estate & Railroad.—The officers of this new Florida company are D. Hughes, of Bartow, President; W. B. Varn, Bartow, Treasurer; and Fred N. Varn, Fort Meade, Secretary.

Rutland.—The stockholders have re-elected all the old officers.

Saginaw & Durand.—The officers of this new Michigan company are: J. M. Ashley, Jr., Manager; A. W. Wright, Saginaw, President; P. H. Ketcham, Vice-President; W. R. Burt, Treasurer; W. C. McClure, East Saginaw, Secretary.

Silverton.—The officers of this Colorado company are: Otto Mears, President and General Manager; George Crawford, Vice-President; Fred Wilson, Treasurer and Assistant Secretary; John W. Wingate, Secretary and Assistant Treasurer; J. H. E. Waters, Chief Engineer; Adair Wilson, Attorney.

Sonoma Valley Extension.—The directors of this new California company are James M. Donohue, Henry C. Whitney, Thomas W. Johnston, J. K. Looke and C. C. Lippett.

Syracuse, Ontario & New York.—George H. Graves has been appointed Superintendent.

Texas & Pacific.—Jacob Johann, Superintendent of Motive Power, will perform the duties of Master Mechanic of the Eastern Division of this road, in place of A. H. Watts, resigned.

Toledo, Cincinnati & St. Louis.—W. S. Weed has been appointed General Freight Agent, with headquarters at Toledo.

Western Railway Weighing Association.—George L. Carman will succeed Mr. Wheeler as Chairman on Aug. 1. He will also have charge of the weighing of live stock at the Chicago stock yards, and the inspection of freight in Western and Northwestern territory.

OLD AND NEW ROADS.

Alabama & Birmingham.—This railroad company has become consolidated with the Alabama & Tennessee Coal Co. and the Alabama Improvement Co.

Alabama, Florida & Atlantic.—John A. Prentice, of Palatka, Fla., has the contract for 75 miles of this road.

Abbottsford & Merrill.—The survey of this line in Wisconsin is being completed. The contract for grading the line will be let inside of a month. The line will run from Abbottsford, Wis., to Merrill, with a line to Wausau diverging at Rib Lake. It will be about 70 miles long. It will be operated as a part of the Wisconsin Central system.

Arizona Mineral Belt.—Twenty-two miles of track have been laid, 30 miles graded and materials are on hand for 35 miles more. The road is owned largely by the Atlantic & Pacific.

Atchison, Topeka & Santa Fe.—Track is laid 7 miles west of Carrollton, Mo., on the Chicago extension. Seventy-one pound steel rails are used. About 75 cent. of the grading on the line has been completed. The work yet to be done is in the heavy cuts. Work is progressing satisfactorily on the Sibley bridge. It is expected to have the line finished by Dec. 1.

Atlanta & Hawkinsville.—Tracklaying began on July 28 at Roselynd, Ga., just out from Atlanta. About twenty miles are graded.

A bill has been introduced in the Georgia Legislature amending the charter of this company by changing its name to the Atlanta & Florida. The provisions of the bill give the company the right to build a line from any point on its main line in Houston, Dooly or Worth to Du Pont, and from that point to any point on the state line between Georgia and Florida, and may build through any county or counties between the points named. Also to construct a line from Thomasville to any point on the state line between Georgia and Florida, and a line from any point on its line in Colquitt County, through Colquitt and Brooks counties to any point on the Florida line.

Baltimore & Ohio.—Papers were served last week upon President Garrett in two suits brought by Messrs. Ives and Stayner, one for the performance of a contract for the delivery by Garrett to Ives and Stayner at a fixed sum of the controlling interest in the Baltimore & Ohio properties; the other for pecuniary damages for breach of said contract.

The transfer boat John W. Garrett, which is being built

by the Harlan & Hollingsworth Co. at Wilmington, Del., for this company is to be launched next week, and will be the largest boat ever built by the company. She will be 366 ft. long, 41 ft. beam amidship, 72 ft. between guards and 13¼ ft. depth of hold.

Boston & Quebec Air Line.—The Maine Railroad Commissioners have refused to approve of the location of this line from Skowhegan to Jackmanton.

Buffalo & Geneva.—It is stated that this road is soon to be built. E. M. Leuffer, who has been appointed Chief Engineer, will at once perfect the survey, and as soon as this is done bids for the construction will be invited. The road will run from Geneva to Buffalo, a distance of 205 miles, the eastern connection being with the Geneva, Ithaca & Sayre Railroad, which will connect the new road with the main line of the Lehigh Valley.

Burlington & Missouri.—Construction on the Nebraska branch of this road has reached a point 30 miles west of Grant, Neb. Superintendent of Construction Hazlett expects to have rails laid to Cheyenne, Wyo., early this fall.

Cape Breton.—It is understood that the contract for the construction of the second section of this road, from Grand Narrows to North Sydney, 80 miles, has been awarded to James Isbester of Ottawa.

Cape Girardeau & Southwestern.—The survey is finished from Greenville, Wayne County, Mo., to Wappapello, the present terminus of the road.

Carolina & Knoxville.—Arrangements have been completed for the construction of this road. Chief Engineer Ramsour has been directed to survey the line and get the work ready for contractors, sufficient money being guaranteed.

Central Iowa.—The time for security holders to assent to the reorganization of this company has been extended to Aug. 23. About three-fourths of the shareholders have paid the first call of $2 per share on the assessment.

Central Missouri.—The first spike on this road was driven at St. Charles, Mo., last week. The wife of Col. J. T. K. Hayward, Chief Engineer, performed the ceremony, and she was presented with a solid silver spike to commemorate the event. The ties are laid for the first 20 miles. Tracklaying will be rapidly pushed.

Chateaugay.—A large force of men is now extending this road from Loon Lake westward to Saranac Lake, N. Y., a distance of 18 miles, and it will be completed before winter. It will run within 4 miles of Paul Smith's, 1 mile of Saranac Lake and 8 miles of Lake Placid.

Chattanooga, Rome & Carrollton.—President J. D. Williamson says that work will begin on this line within 10 days. Chattanooga, Tenn., has voted $100,000 in bonds toward the building of the road.

Chautauqua Lake.—The road is opened with trains running on schedule time. They extend through from Jamestown, Chautauqua County, N. Y., to Mayville Station, and thence, via the Buffalo, New York & Philadelphia to Brockton, where connection is made with New York, Chicago & St. Louis and Lake Shore & Michigan Southern trains. At Jamestown they connect with the New York, Pennsylvania & Ohio. The extension of the line from Mayville Station to Westfield, it is said, will not be prosecuted at present.

Chicago, Burlington & Quincy.—The company has closed a contract with the Union Pacific Bridge Works for another bridge across the Missouri below their own bridge at Plattsmouth, Neb., to connect their Red Oak & Hamburg division with the line from the river at Nebraska City through Lincoln. The line now runs 11 miles up the river to East Nebraska City, directly opposite, but a cut-off will probably be built from Shenandoah through Sydney to the river.

It is reported that committees have been appointed to arrange terms of consolidation for this company with the Chicago, Burlington & Northern.

Chicago & Eastern Illinois.—The company will shortly commence building a branch from Momence to Goodell, Ill., a station on the Chicago & Indiana Coal road, which will give the latter an independent outlet into Chicago. The new branch will be 35 miles long. It will save the rental of the Louisville, New Albany & Chicago to the Chicago & Indiana Coal road for the use of the former's track from Fair Oaks, Ill., to Chicago. The St. Louis division of the Chicago & Eastern Illinois is finished to within a mile and a half of Tuscola, Ill.

Chicago East & West.—This company, which was recently incorporated with a capital stock of $10,000,000, has completed its organization and begun work on the location of its lines. Its charter authorizes the building of a road across the state of Illinois, including an entrance into Chicago. No application has yet been made to the Common Council for right of way. There seems to be little opportunity left for locating new lines into the city, and it is thought that this new road will have to go in, if at all, over some road already built.

Chicago, Kansas & Southwestern.—A meeting was held last week at St. Joseph, Mo., by the projectors of this road. The company was recently incorporated. At this meeting it was decided to build the road from Parnell, Neb., 10 miles east of Maryville, going directly west through Maryville to Rulo; thence diagonally through the southern corner of Nebraska to Hiawatha, Kan.; thence through that state to Cowley County, where it will terminate.

Chicago, Rock Island & Pacific.—A surveying party recently sent out by this company for the purpose of discovering a practical route between the Central Pacific and the Atlantic & Pacific to the coast, has reported a route beginning some distance from Fort Wingate, in New Mexico, crossing the Colorado River above Grand Canyon, passing through Pioche, Tybo and Owens, crossing the Sierras through King's Pass, emerging in the vicinity of Lubere Lake, Cal., and following the San Joachim Valley to the coast.

Cincinnati, Hamilton & Dayton.—Messrs. Ives, Staynor & Co. announce that the additional $10,000,000 of preferred stock recently authorized is not to be issued. It is presumed that the failure to carry through the Baltimore & Ohio deal removes the necessity for providing funds for double tracks and additional terminals. Formal action rescinding the resolution authorizing the issue cannot be taken until 30 days' notice of such intention has been given, but it is already definitely decided that no issue will be made.

It has been stated that this company purposes using the Chicago, St. Louis & Pittsburgh track from Richmond, Ind., to Anderson, where the Cincinnati, Wabash & Michigan will be used to Bolivar, Wabash County, and thence into Chicago over the Chicago & Atlantic. The southern extension scheme of the Cincinnati, Wabash & Michigan to connect with the Cincinnati, Hamilton & Dayton at Rushville, Ind., is said to have been abandoned for the present.

Cincinnati Southern.—The company will build a 2 mile branch from Amnicola, Tenn., to the mouth of the Chickamauga Creek.

Colorado Midland.—The last one of the heavy iron bridges on this road is approaching completion, and when it is finished the line can be rapidly built to Leadville, Col.

Columbia, Newbury & Laurens.—This company will shortly advertise for bids for building approaches to the Broad River Bridge, S. C.

Columbus Southern.—The company has organized with T. J. Pearce as President; Nelson Tift, of Albany, Vice-President, and C. B. Grimes, Treasurer.

Denver & Rio Grande.—Construction work is rapidly progressing on the extension from Montrose, Col., to Chipeta. The bridge now building over the Uncompahgre canal is about finished. Rails have been laid to Fort Crawford.

Duluth & Iron Range.—The new owners of this road are to build 9 large steamers to carry ores down the lakes.

Duluth & Manitoba.—The company has leased to the Northern Pacific its line through Clay, Norman and Pope counties, Minn., and a branch through East Grand Forks, the Northern Pacific agreeing to complete the road from East Grand Forks to Pembina, Dak., and the main line from a point near Redwood Falls to the international boundary. The lease is for 50 years.

Duluth, South Shore & Atlantic.—On the Sault Branch a construction train of 7 cars is engaged in tracklaying, and about 12 miles of track has been laid from Sault Junction, all through a swamp. While progress is necessarily slow 5 miles more will bring the track to heavier ground, and then it is expected that 2 miles a day can be laid. On the Western extension but little tracklaying has yet been done. A construction train has just started in at the crossing of the Milwaukee, Lake Shore & Western at Dogwood, the western end of the Gogebic division, and is laying track east from that point. Work on the Gogebic and Western divisions is well along. The company will not run its own line into Duluth, but will use the Northern Pacific track from the point where it strikes that road west of Ashland. It is expected that the track will be laid into Soult Ste. Marie, Mich., by the middle of August.

East & West Alabama.—Tracklaying has begun on the extension from Broken Arrow, Ala., to Pell City, on the Georgia Pacific.

Galveston, Sabine & St. Louis.—The bridge on this road across the Sabine River, Tex., is completed. Cortlee & Co. built it.

Grand Trunk.—Drew, Lewis & Co., of Niagara Falls, have the contract for double tracking this road between Lansdowne and Gananoque, 9 miles; T. R. Raphael & Co., of Ottawa, for 2½ miles between Scarboro and York; Ross & McRae have 10 miles between Vaudreuil and Coteau, and the company will do the work between Montreal and Lachine. Proposals will soon be open for the line from Lachine to Valois, and when it is finished it is expected the Victoria Bridge will be double tracked.

It is reported that this company intends petitioning the Legislature of British Columbia for a franchise for a road through the Yellow Head Pass and Chilcotin County *via* Bute Inlet to Esquimal. The Yellow Head Pass is about 150 miles north of where the Canadian Pacific crosses the Rocky Mountains. The proposed route, after getting across the mountains, would cross Frazer River 200 miles above New Westminster, B. C.

Guelph Junction.—Tenders will be received till Aug. 15 for construction of this road from a point in the city of Guelph, Ont., to a point on the Credit Valley road about a mile west of Campbellsville, a distance of 15½ miles. D. McCrae, Secretary, Guelph, Ont.

Hartford & Connecticut Western.—The directors will hold an important meeting within a week, when changes in the management will be made. It is stated that Wm. L. Gilbert, of Winston, Conn., will retire from the Presidency of the road and that ex-Speaker Husted, of New York, will succeed him. The financial obligations of the Pennsylvania & New England Construction Co. to this railroad company have been made and the road will soon pass to the control of the Philadelphia syndicate.

Hartford & Tichenor.—A railroad is proposed between these Kentucky towns, a distance of 14 miles. Tichenor is on the Owensboro & Nashville line.

Illinois Central.—The line from Cherokee to Onawa, Ia., 65 miles, will be graded from Cherokee to Correctionville by Harrington Bros., of Des Moines; from Correctionville to Onawa by Mitchell, of Vincent, Ia.; bridging of the whole line has been let to W. C. McNamara, of Sioux City.

It is rumored that the company will build a line from Jackson, Tenn., via Brownsville to Kansas City, Mo., and also one from Jackson to Birmingham, Ala.

Iron.—This company has executed a mrtgage to cover $600,000 4 percent. bonds to the International Trust Co., Boston. The road will be merged into the Cincinnati, Hamilton & Dayton system.

Jacksonville & Fort George Island.—A company has been formed in Florida to build a road from Broward to Fort George, in that state.

Kansas City, Wyandotte & Northwestern.—The company will build machine shops at Seneca, Kan. E. Summerfield, Wyandotte, Superintendent.

Lake Superior & Southwestern.—This company will build a road from some point on Lake Superior southwest through Red Wing, Rochester, Brownsdale, Austin, Northwood, Minn., to Clear Lake, and from thence to Omaha and Kansas city. Capital stock $1,000,000, divided into 10,000 shares.

Leamington & St. Clair.—This Ontario company is purchasing new equipment to be used in tracklaying and ballasting. Work begins at once, and the expectation is to have the road complete this fall.

Louisville, Cincinnati & Dayton.—Chief Engineer Paton has given instructions for the discharge of all locating engineers between Aurora, Ind., and Louisville, Ky. This is caused by the vexatious litigation in obtaining right of way, and the road will perhaps never be built.

Maricopa & Phœnix.—The new road between Maricopa and Phœnix, Ariz., is exactly 34½ miles long. It is broad gauge. The rails were supplied by the Troy Iron & Steel Co., of Troy, N. Y. The bridges were built by the Pacific Bridge Co., and use the Pratt truss combination with cylinder piers. The one across the Gila River is of two spans, each 150 ft. in length, while 330 ft. of piling were necessary for the approaches. That crossing the Salt River is much longer, having three 150-ft. spans, with 1,060 ft. of piling. The two 10-wheel engines were turned out by the Baldwin Locomotive Works, of Philadelphia. The passenger coaches were made by R. G. Brill & Co., Philadelphia, while the freight cars were furnished by the Lehigh Car Co., of Stanton, Pa., and the Indianapolis Car Works.

Metropolitan (Chicago).—Articles filed in Illinois. The company proposes to construct a system of underground railroads in Chicago and a suburban syttem. Capital stock, $3,000,000.

Missouri, Kansas & Texas.—The Commissioner of the General Land Office has completed the adjustment of the grant of the state of Kansas for this company, and finds that an excess of 293,431 acres over the amount legally due has been certified and patented for the benefit of the road. The company claims indemnity for all losses within its granted limits, no matter how occasioned, and should this claim be allowed the company would still be entitled to 504,042 acres. The commissioner recommends that suit be instituted by the government to recover the excess as found by him.

Missouri Pacific.—It has been reported this week that the Missouri Pacific system has been swindled out of $1,000,000 in three years by means of contracts for ties. Referring to this statement, Mr. Gould has said that the story as published is greatly exaggerated. He says that some time ago, upon discovering that the cost of ties was suddenly increasing, he asked the Expense Committee for an explanation and found that the bills for ties were not presented to this committee, but were audited by the Division Superintendents. On his recent visit to the Southwest, Mr. Gould says he made some inquiries on the subject, and had the method of doing business changed. The Expense Committee now passes on all purchases of ties, and the services of a middleman are dispensed with.

Mobile & Birmingham.—Z. T. Copening has been awarded the contract to build 60 miles of this road.

Mobile & Dauphin Island.—The road is being gradually built. Four miles of road are graded and ten miles located.

Monongahela East Shore.—Charter granted this company in Pittsburgh, Pa., to build a 2 mile road. Capital, $50,000.

Natchitoches.—The steel rails for this road, which is to be built from Natchitoches, La., to Prudhomme Station, on the Texas & Pacific, have been ordered from England, and will be delivered Aug. 1. B. Dudley Coleman, of New Orleans, has received orders for box and platform cars, and these are now being built. Men are at work on the roadbed, and the road is to be ready inside of 90 days.

New Mexico & Arizona.—Recent floods on this road caused a break which stopped all traffic for two weeks.

New Roads.—A company has been organized in San Diego, Cal., to build a road from that city through Teralta and La Mesa to the El Cajon Valley, a distance of 15 miles. Work commences this week.

A company was organized last week at Elsinore, Cal., for the purpose of building an elevated electric railroad around Lake Elsinore. The capital stock is fixed at $900,000, of which $282,000 has been subscribed. A franchise has been granted and work is to begin in 60 days.

The Detroit *Free Press* says that the present trip of Gen. Alger, Chauncey M. Depew and Henry B. Ledyard to Europe is for the purpose of placing $7,000,000 of bonds of a new road. It is designed to build an entirely new line from the Straits of Mackinaw to Duluth, running midway between the consolidated Duluth, South Shore & Atlantic, and Milwaukee, Lake Shore & Western, and Chicago & Northwestern roads, which now skirt the southern boundary of upper Michigan peninsula, and the partly completed Minneapolis, Sault Ste. Marie & Atlantic road.

New York, Lake Erie & Western.—The coroner's jury found the following verdict in the accident at Hohokus last week, in which eleven laborers were killed: "We, the jury, censure the New York, Lake Erie & Western Railroad Co. for killing the laborers west of Hohokus, July 21, 1887, through neglect of said company for not having proper signals to warn their trackmen of approaching trains."

New York, New Haven & Hartford.—It is said that the company will build a branch road to parallel the New Haven & Derby, recently acquired by W. H. Starbuck. The new line will be built from Derby, Conn., to Woodmont. The road was surveyed some time ago.

Northern Pacific.—There was a meeting of directors held in New York this week. The annual report was read and it makes a most favorable showing. Traffic arrangements were ratified with the new branch line which runs through the Walla Walla wheat valley, leaving the main line at Pendleton, Oregon, and striking it again at Ainsworth, and also with the branch line being built by the Rock Fork Coal Co., which leaves the main line west of Billings.

It is stated that this company has made arrangements with the Pacific Coast Steamship Co. for the exclusive use of two of its steamers between San Francisco and Tacoma, W. T.

New York, Pennsylvania & Ohio.—The incorporated Newcastle & Shenango Railroad, formerly the Newcastle Northern, has been leased to this company for 99 years, and will be completed by the lessees and made a connecting link with the Sharon Railroad at West Middlesex, Pa., giving a line through the Shenango Valley.

Norfolk & Western.—The company contemplates building at Lambert's Point, Va., 7 additional piers, a grain elevator with about 500,000 bushels capacity, and stock yards capable of accommodating 2,000 heads of cattle and sheep.

Oregon Pacific.—Nelson Bennett has the contract for building this road east from Albany, Oregon, to the Cascade Mountains.

Oregon Railway & Navigation.—Work began on the bridge across the Willamette River at Portland, Oregon, on July 27. The work is under the charge of George A. Lederle, of Omaha, Neb. Everything will be ready for the superstructure about Nov. 1. The bridge will be entirely of iron and steel, and will have an overhead roadway for teams and for foot passengers.

Ottawa, Waddington & New York.—Ground was broken on this road at Morrisburg, Ont., on July 27. The directors are about to complete arrangements with New York capitalists, whose intention it is to build a direct line from Schenectady to the bridge site at the St. Lawrence River. Agreements have also been entered into for the delivery of the material requisite for the bridge over the St. Lawrence River at once.

Pacific.—The Investigation Commission began its sessions in San Francisco this week in the rooms of Leland Stanford, President of the Southern Pacific. Documents overhauled by the commission show the amount paid to the Pacific Mail from September, 1871, to March, 1886, by the Union Pacific Co. to have been $1,994,000; by the Central Pacific, $2,030,000; by the Southern Pacific, beginning in 1883, $256,000.

Panama.—The road is reported to be in good condition. Passenger trains make the run across the Isthmus in two hours. There have been depots built at every town on the line besides the large iron depots at Panama and Colon. Passengers are now compelled to buy tickets before entering the trains, instead of paying their fare to the conductors.

Pennsylvania.—It is stated that the company will sell its hotel property at Bryn Mawr and Cresson Springs, Pa.

Perkiomen.—The Receiver and Reconstruction Trustees of the Philadelphia & Reading, which is a large holder of first-mortgage bonds of the above company, have approved the plan of the latter's reorganization. The plans provide for the cancellation of the first-mortgage 6 per cent. bonds, which matured April 1, 1887, and the consolidated mortgage, which is guaranteed by the Reading. A new first-mortgage for $2,250,000 will be created to secure two series of 30-year coupon bonds. The first series for $800,000 will be preferred and bear 5 per cent. interest, and they will be used to take up the outstanding first-mortgage bonds, amounting to $799,600. The second series of $1,450,000 will bear 4 per cent. interest, and will be used to take up the consolidated mortgage bonds, amounting to $1,125,000.

The balance will be used for equipments and improvements. The Reading will guarantee the principal and interest of both series of bonds. Securities are to be deposited by Sept. 30 with the Pennsylvania Company for insurances on lives and granting annuities. The Perkiomen Railroad is 38½ miles long, extending almost directly north from Perkiomen Junction to Eman's Junction.

Philadelphia & Erie.—A road is being surveyed to run from Westport, Pa., on this road to a point on the Jersey Shore & Pine Creek road.

Philadelphia & Reading.—Employés are again in conference with Superintendent Sweighard in reference to the order requiring them to be examined as to color blindness. The officers of the company say that everything will be arranged to the satisfaction of the men.

The Philadelphia & Reading are introducing some 50,000 lbs. coal cars. They are stated to be modelled after the Pennsylvania pattern.

Pittsburgh, Fort Wayne & Chicago.—C. Slataper, Chief Engineer of the Pennsylvania Company, has been in Chicago for the past week in the interest of his corporation, in connection with the building of several viaducts along the Fort Wayne road inside the city limits.

Pittsburgh, Youngstown & Ashtabula.—Under this name the Ashtabula & Pittsburgh, the Niles & Alliance, Lawrence & Newcastle, and the New Brighton railroad companies have been consolidated. The new line is 125 miles long and connects the Ashtabula harbor with the Pennsylvania system.

Polk County Real Estate & Railroad.—Organized in Florida. Capital stock, $100,000.

Railway & Navigation.—Incorporated in Minnesota. The object is to build a road from St. Paul and Minneapolis to a point on Lake Superior, with a new line of boats to connect at that point. It is an extension of the Minnesota & Northwestern.

Red River Valley.—The Dominion Government contemplates issuing an injunction to restrain the contractors from laying the track on lands owned by the Government. It is stated that if the officers of the law are resisted the militia will be called out.

The sub-contracts on this road in Manitoba have been let to M. Strevel, Egan Bros. and Bryson & Irvine.

Saginaw & Durand.—Organized in Saginaw, Mich., to build road from Saginaw to Durand, 35 miles, and connect at the latter place with the Toledo, Ann Arbor & North Michigan, Chicago & Grand Trunk and Detroit, Grand Haven & Milwaukee.

St. Joseph Electric.—An electric motor road has just been put in operation in St. Joseph, Mo. The Sprague electric motor is the one used.

St. Louis, Arkansas & Texas.—It is said that the company will now survey a line from Sherman to Abilene, Tex. McCarthy & Kerrigan, of Little Rock, Ark., will build the Louisville-Shreveport line. They have sublet 15 miles. The whole line is 65 miles. It is to be finished by Nov. 1. Much excavation will be required. Twenty-two miles of tunnel are called for by the contract. The road will connect with the St. Louis, Iron Mountain & Southern at Louisville, Ark.

St. Louis & San Francisco.—The company is now extending its Little Rock branch east from Hackett City, Ark., to Chocoville, Sebastian County. It is thought that the line will be extended this fall, at least as far as Golden City, and be pushed to Little Rock during the winter.

St. Paul & Duluth.—The new shops will be located at Gladstone, Minn.

Shepaug.—The president of this company denies the report that his road has been sold to W. H. Starbuck for an addition to the New York & New England system.

Silverton.—Incorporated in Colorado to build a narrow gauge road from Silverton to the Yankee Girl mine, 11 miles. Contracts have been let and it is expected to have the road completed by Oct. 1.

Staten Island Belt Line.—Incorporated in New York to operate a road from Bowman Point to South Beach, with loops to Tompkinsville and Port Richmond, S. I., a distance of 18 miles.

Sonoma Valley Extension.—Incorporated in California. The company proposes to build and operate a road from Glen Ellen in Sonoma County to Santa Rosa. Capital stock, $300,000. Estimated length of road, 16 miles.

South Pennsylvania.—Ackerman & Evans, contractors for building the tunnels near Shippenburg, Pa., for this company, will begin work at once.

Taylor, Bastrop & Houston.—Track is laid from Taylor, Tex., to Smithville a new town on the Colorado River, 16 miles below Bastrop, and by Aug. 1 will be laid to Lagrange. The roadbed of the branch from San Marcas is completed to Lockport, and by October will be finished to Smithville, where it connects with the main line from Taylor.

Utah & Northern.—The road from Silver Bow to Potatello, Mont., was changed to standard gauge in a few hours on July 25. The distance is 246 miles.

Vaca Valley & Clear Lake.—A force of graders have begun work on the extension of this road from Madison, Yolo County, Cal., its present terminus, up the Capay Valley, following the Cuche Creek to Lakeport.

Virginia Beach.—The company which recently purchased the property of the Virginia Beach & Improvement Co. has paid over the amount of the purchase and reorganized under the above name.

Wabash Western.—It is stated that this company has an option on the Toledo, St. Louis & Kansas City, which runs from Toledo, O., to East St. Louis, Ill., 450 miles.

Wheeling & Lake Erie.—The directors will present an address to the stockholders recommending an extension of the road from Bowerstown, O., to Wheeling, W. Va., 20 miles, the intention being to make the road a through line from east to west.

York Harbor & Beach.—This road, which connects York Village, York Harbor and York Beach, Me., will be opened to public travel on Aug. 8. The citizens of York are subscribers to the road for $50,000; stockholders of the Boston & Maine road as individuals subscribed $75,000, while the Boston & Maine Co. subscribed $125,000.

TRAFFIC AND EARNINGS.

The Inter-state Commission.

The Commissioners delivered opinions in four of the cases recently brought before them. The cases entitled Louis Larrison against the Grand Trunk and that of the Michigan Central against the Grand Trunk were heard together. The charge was unjust discrimination. The opinion reviews and discusses at length the various points set up by the defendant and concludes as follows:

Common carriers may continue the issuance of mileage passenger tickets, the charges for which must be reasonable and just and free from unjust discrimination or unreasonable preference. Persons belonging to the class known as commercial travelers are not privileged to ride over railroads at lower rates than are paid by other persons. Whatever reasonable rates commercial travelers are made to pay other travelers may be made to pay. To charge one more than another is unjust discrimination, and this is true whether tickets issued are mileage tickets or in some other form. The refusal of the defendant, the Chicago & Grand Trunk Railway Company, to sell the complainant, Larrison, a thousand mile ticket for $20, the price at which said company was selling such tickets to commercial travelers, and the neglect to publish rates at which defendant was offering to sell mileage tickets, were alike in conflict with the "act to regulate commerce."

The case of the St. Louis wholesale grocers against the Missouri Pacific, embodies a complaint that while commutation tickets are sold at rates which would amount to not more than $15 for a thousand miles, the thousand-mile tickets upon which commercial travelers travel are not sold for less than $25. The Commission is also asked to order and direct that a discrimination be made in favor of commercial travelers, in short that thousand-mile tickets be sold to them at lower rates than to others. The Commission does not regard the fact that commutation tickets are put on sale at a given rate to be one that entitles the purchaser of a mileage ticket to complain of unjust discrimination if charged a higher rate. The "circumstances and conditions," the opinion says, are not the same. The Commission finds nothing in the testimony submitted going to show that the charge of $25 for a thousand-mile ticket is unreasonable. In respect to the order it is requested to make in favor of commercial travelers the opinion says: The Commission would hardly be willing to make such an order in any case, however urgent the circumstances might seem to be. But in respect to this matter we are agreed that the entire policy and spirit of the law are against it, and that when mileage tickets, as distinguished from trip tickets, are issued, they should be sold to all impartially and on the same terms.

The Commission has rendered a decision in the Burton stock car case to the effect that there is no apparent ground upon which the railroads can be ordered to pay mileage to the Burton Co. In respect to the alleged unreasonableness of the charge to shippers of stock by the Burton cars in excess of that to shippers by ordinary cars the Commission says the case is not satisfactorily presented. The Commission is strongly impressed with the belief that the charge may be too high, but it does not now record a finding. It commends its suggestions upon this point to the Western Classification Committee of the Railroads, and retains the question for future consideration.

The chairman of the Commission has announced the decision in the case of the Providence Coal Co. against the Providence & Worcester Railroad. The complaint covers three main points. The Commission decides that the allowance of a rebate to persons who ship more than 30,000 tons a year is unwarranted and invalid. The Commission also decides that the charge of a higher rate upon shipments from Providence than upon those from East Providence is unwarranted and invalid. The third point relating to a charge of 8 cents for street hauling is decided to be a matter with which the Commission cannot deal.

W. H. Council, the colored preacher of Alabama, who some time ago made complaint to the Commission against the Western & Atlantic Railroad Co. for forcibly ejecting him from a passenger car, obtained a hearing before the Commission this week. The case opened with the reading of Council's complaint and the Railroad Company's answer. Council swears that while seated in a passenger car en route from Chattanooga to Atlanta, over defendant's road, he was ordered by a railroad employé to go into a smoking-car set apart for colored people. He refused to comply with this request, unless directed to do so by the conductor; but soon afterward was assaulted by two railroad employés, one of whom struck him several times with a lantern. He was afterward dragged to the smoking car. All of this, he claims, is in violation of section 3 of the Inter-state Commerce law, and he therefore claims $55,000 damages for this discrimination against a passenger who held a first-class ticket. The railroad company in its answer denies that Council was subjected to this assault by railroad employés; that in entering the car set apart for women he was violating the rules of the company, and that in entering that car he intended to disturb the public peace. The truth is, it is stated in answer, some men in the women's car took the case in their own hands, assaulted Council and ejected him from the car. Counsel on both sides submitted argument by briefs and the Commission took the case under advisement.

The Commissioners have given an opinion in the case of the Traders and Travelers' Union against the Philadelphia & Reading. The case involves the fulfillment of contracts for the free transportation of baggage, upon the presentation of the Union's certificates, in excess of the amounts so transported for other travelers. The Commission finds that the matter is one coming outside of its jurisdiction, and, therefore, refuses to interfere in the matter. The petition was dismissed.

The Buffalo Business Men's Association, which was organized a few weeks ago, will present a statement to the Inter-state Commission to show that Buffalo is discriminated against by the railroad companies to a greater extent than any other city in the country.

The Boston Chamber of Commerce complains to the Commission against the Lake Shore, New York Central and Boston & Albany railroads that the charge from Chicago to Boston upon flour, grain and provisions is thirty cents per hundred pounds, or $90 per car, whereas the rates to New York have been only twenty-five cents per hundred pounds, or $75 per car. It is also charged that a rebate is allowed upon goods consigned from Chicago to Boston and designed for shipment abroad.

The case of Ralph L. Thacher, of Schenectady, N. Y., against the Fitchburg Railroad Company and others, embodied a complaint that while the defendants formerly accepted grain for transportation from complainant's elevator to Boston at the proportion of through rates from Chicago allowed to the lines east of Schenectady, which was practically 6 cents per hundred, they now demand local rates, which are considerably higher, and a restoration is asked. The complaint was dismissed. The opinion says: The rates with which complainant finds fault it is not claimed are in conflict with the statute unless the conflict is found in the fact that they exceed what the roads accept on through business as their proportion of the rates fixed at distant points. If that is any sense contrary to the law the illegality would not be corrected by compelling the roads to accept upon shipments from Schenectady rates less than are charged from the stations further East. We cannot correct one alleged violation of law by compelling another.

The second case of the St. Louis grocers against the Missouri Pacific Railroad Company, complaining that the difference charged upon less than carload shipments as compared with full carloads is too great, has not yet been decided, all parties having assented to a postponement, to give the New York people an opportunity to put in like complaints against other railroad companies. Five complaints of this nature against the Western trunk lines were received from New York, but as they had not been verified as required by the Commission they were returned.

The Inter-state Commerce Commission has created a bureau to be styled the Department of Statistics, the head of which will be denominated the Auditor. Mr. C. C. McCain has been appointed Auditor and will enter upon his duties Aug. 1. Mr. McCain is a native of Minnesota and has held for several years a responsible position in the office of Albert Fink, Trunk Line Commissioner in New York City.

Coal.

The coal movement for the week ending July 23 is reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite	670,266	611,148	I. 58,118	9.5
Bituminous	236,802	258,233	D. 21,431	8.2
Coke (July 16)	37,531	75,500	D. 37,968	50.2

Cumberland coal shipments for the week ending July 23 were 59,532 tons, and for the year to that date, 1,714,692 tons, an increase of 678,082 tons as compared with the corresponding period last year.

The coal tonnage of the Pennsylvania road for the week ending July 16 was:

	Coal.	Coke.	Total.	1886.
Line of road	189,569	37,531	227,100	185,68

Increase for the week, 41,420 tons, or 22.3 per cent.

Cotton.

The cotton movement for the week ending July 22 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Interior markets:				
Receipts	1,165	7,323	D. 6,158	84.0
Shipments	5,825	12,152	D. 6,327	52.0
Stock	29,188	64,810	D. 35,622	54.9
Seaports:				
Receipts	3,295	6,744	D. 3,449	51.1
Exports	18,931	29,459	D. 20,528	52.0
Stock	212,622	256,296	D. 43,674	17.0

Total movement from plantations for the crop year ending July 22 was 6,344,288 bales, against 6,455,130 for last year, 5,592,976 in 1884–85, and 5,643,063 in 1883–84.

Sault Ste. Marie Canal Commerce.

The report read at the convention of marine men at Sault Ste. Marie, Mich., last week, showed an increase in vessel passages to the last of July over last year of 714; increase in tonnage, 483,000 tons. Eight-four vessels had passed through the canal in one day. The estimated maximum number was 96. One day last June 49 vessels passed through, carrying upwards of 49,000 tons, over 1,000 tons to the vessel. The average daily tonnage this year is 26,786, while 15,000 tons passes daily through the Suez Canal, thought to be the most important of the globe. Altogether it is estimated there will be an increase of 6,000,000 of tons over last year.

East-bound Shipments.

The shipments of all freight except live stock from Chicago eastward to seaboard points amounted, for the week ending last Saturday, to 27,286 tons, against 24,162 tons for the week previous, an increase of 3,124 tons. The percentages carried by the different roads were as follows: Chicago & Grand Trunk, 10.3; Michigan Central, 24.6; Lake Shore & Michigan Southern, 12.6; Pittsburgh, Fort Wayne & Chicago, 23.4; Baltimore & Ohio, 5.4; New York, Chicago & St. Louis, 7.2; Cleveland, Columbus, Cincinnati & St. Louis, 0.5; Chicago, St. Louis & Pittsburgh, 16.0.

Freight Car Famine.

The demand for cars has increased so rapidly within the past week that the different roads centering in Pittsburgh, Pa., have been taxed beyond their capacity. The Pennsylvania and the Baltimore & Ohio have required many more cars than could be furnished. The demand is increasing daily, and this is an index of the immense business now being transacted throughout the country.

Trouble Over East Bound Passenger Rates.

The Michigan Central is charged with selling round trip tourist tickets to White Mountain points via Worcester and Boston at $41, a cut of $3. Competing companies upon learning of the cut decided to meet it. The Chicago & Grand Trunk began selling round trip tickets to Boston, via Montreal, at $41. The Niagara Falls Short Line made the same rates, less the regular differentials, which made net rates to Boston and return only $39, or a cut of $5. The New York, Lake Erie & Western will also meet these rates.

A Special Rate for a Presidential Committee.

The Ohio & Mississippi recently made a special rate for the committee that went to Washington from St. Louis to invite President Cleveland to visit their city. On account of this the St. Louis, Vandalia & Terre Haute announced a $15 round trip open to the public. The latter company claims that the Ohio & Mississippi violate the Inter-state Commerce law by discriminating in favor of the Presidential Committee.

Rate War Ended.

The freight rate war, which has been in progress between the Atchison, Topeka & Santa Fe and the roads in the Texas Traffic Association since the opening of the Gulf, Colorado & Santa Fe to Kansas City, has been brought to an end. An understanding has been reached whereby the old rates on competitive traffic are to be restored as soon the required 10 days' notice of an advance will permit.

The Rock Island Abandons Commissions.

The Chicago, Rock Island and Pacific having announced its readiness to accept the contract of the trunk lines for an interchange of traffic, the General Passenger Agents of the Eastern roads will send out orders to put the Rock Island's tickets on sale again in the offices of their companies.